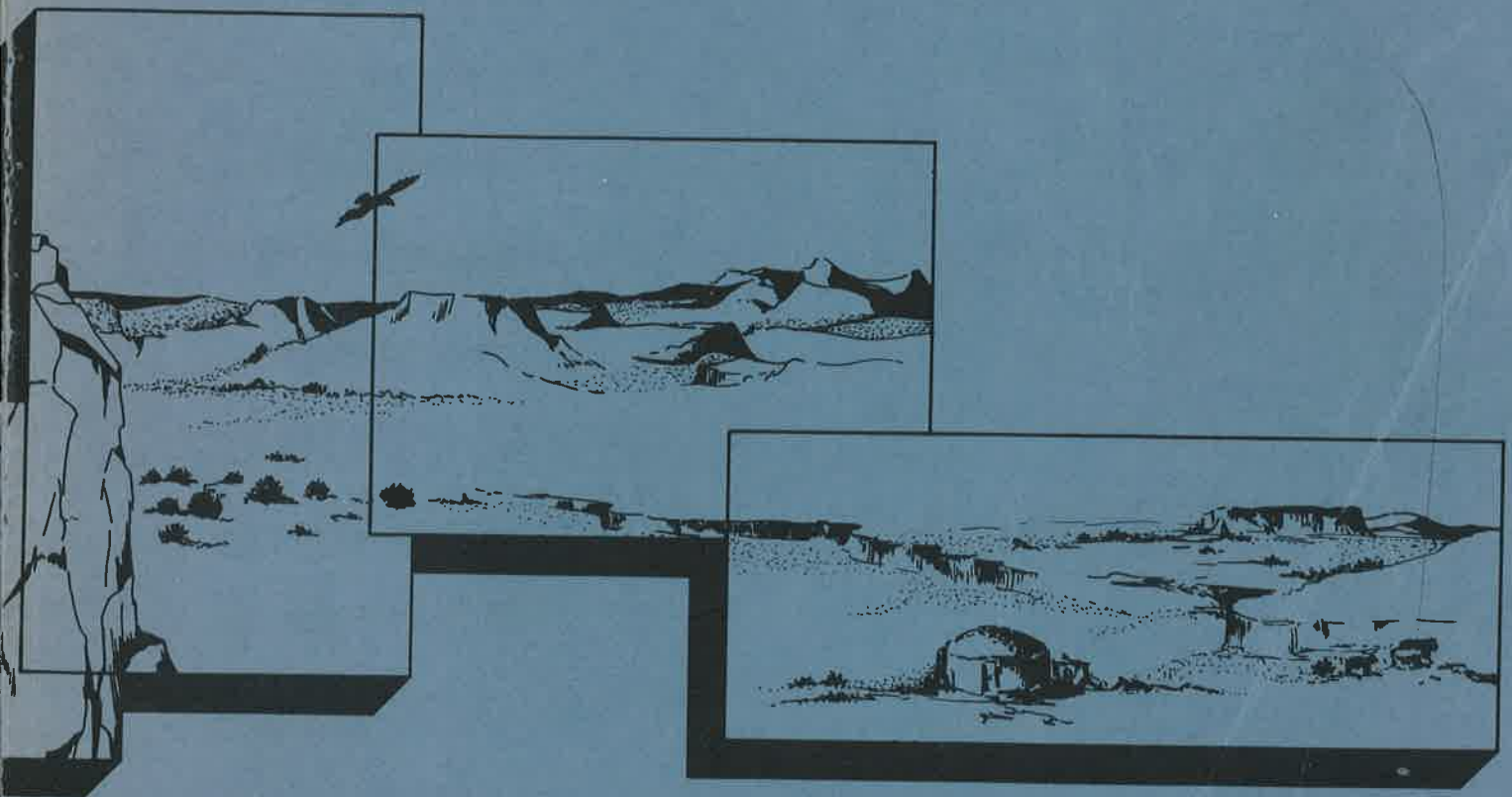


Dawley

FINAL

SAN JUAN RIVER REGIONAL COAL ENVIRONMENTAL IMPACT STATEMENT

MARCH 1984



UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
ALBUQUERQUE DISTRICT OFFICE
FARMINGTON RESOURCE AREA
FARMINGTON, NEW MEXICO



United States Department of the Interior

IN REPLY REFER TO

BUREAU OF LAND MANAGEMENT
NEW MEXICO STATE OFFICE
P.O. BOX 1449
SANTA FE, NEW MEXICO 87501

April 1984

Dear Reader:

The Report by the Linowes Commission on Fair Market Value Policy for Federal Coal Leasing was released to the Congress and to the Department of the Interior on February 17, 1984. The Secretary of the Interior has conducted a full review of the recommendations in this report and has proposed a number of changes in the Department's coal leasing efforts. While a continuation of a proper coal leasing program is in the National interest and essential to the National security, no regional lease sale will be held until these program revisions can be fully implemented.

The Department expects to have in place by December 31, 1984, a decisionmaking process which will allow it to responsibly determine whether specific proposed sales will be in the National interest. While no decision on whether to conduct a regional coal lease sale in the San Juan River Federal Coal Production Region will, therefore, be made at this time, the Secretary is committed to expeditiously processing the 19 Preference Right Lease Applications (PRLA's) not subject to the prohibition in the 1984 Interior Appropriations Act. This environmental statement was prepared in part to meet the requirements of the National Environmental Policy Act on these PRLA's. Its release allows continued processing of the PRLA's, following the required 30-day waiting period. A regional leasing decision will be deferred until the Department has completed its responsibilities on the three Wilderness Study Areas in the San Juan Basin and the new procedures for the coal program are in place.

Sincerely yours,

Charles W. Luscher
State Director



United States Department of the Interior

IN REPLY REFER TO

1792 (910)

BUREAU OF LAND MANAGEMENT
NEW MEXICO STATE OFFICE
P.O. BOX 1449
SANTA FE, NEW MEXICO 87501

March 1984

Dear Interested Citizen:

Enclosed is the Final San Juan River Regional Coal Impact Statement (EIS). This document was prepared by the Bureau of Land Management (BLM) in New Mexico with assistance from cooperating agencies.

The 45-day comment period on the Second Draft EIS closed on November 8, 1983, however, all comments received were accepted and all substantive comments are addressed in the Final EIS. Approximately 500 comments were received.

The primary concerns of the commentors were related to impacts on Indians, availability of water and the need for coal leasing. Local Government responses generally reflected a positive attitude toward a well planned, orderly coal development program, however, concern was expressed with the potential for social services and public facility shortages. These comments and BLM's responses are included in Chapter 4.

The final San Juan Basin Cumulative Overview and comment Letters are contained in a separate volume which has been previously distributed.

Sincerely yours,

Charles W. Luscher
Charles W. Luscher
State Director

FINAL
SAN JUAN RIVER REGIONAL COAL
ENVIRONMENTAL IMPACT
STATEMENT

MARCH 1984

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
ALBUQUERQUE DISTRICT OFFICE
ALBUQUERQUE, NEW MEXICO

DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

FINAL ENVIRONMENTAL IMPACT STATEMENT (EIS)
SAN JUAN RIVER COAL REGION

Type of Action: (x) Administrative () Legislative

Abstract: This EIS analyzes the impacts that would occur in San Juan, McKinley, Valencia and Sandoval Counties in northwestern New Mexico as a result of: (1) four alternative levels of competitive coal leasing and developments (2) issuance of 26 Preference Right Lease Applications (PRLAs), presented as Preference Right Lease Issuance. The Environmental Assessment for Preference Right Leasing, New Mexico (1981), should be referenced for site-specific information on the PRLAs.


The competitive coal leasing alternatives range from no competitive leasing to leasing 1.94 billion tons of coal from 39 tracts under the High Alternative. The Minimum Surface Owner Conflict Alternative has been selected as the preferred alternative. The alternative to the Preference Right Lease Issuance Alternative is Exchange or Legislation. Issuing all 26 PRLAs that meet regulatory requirements has been selected as the preferred alternative.

This is the Final EIS for Round 1 of Competitive Coal Leasing and for Preference Right Leasing in the San Juan River Coal Production Region. On November 30, 1982, the Bureau of Land Management (BLM) filed the Draft San Juan River Regional Coal EIS. That document received a 120-day comment period. In response to comments on that document, the BLM decided the public interest would be served by publishing a Second Draft EIS rather than a Final EIS. The Second Draft was filed on September 30, 1983 and received a 45-day comment period. This Final EIS includes response and text revisions resulting from comments received on the Second Draft. Comments and responses on the November 1982 draft were reprinted in the Second Draft.

The Final San Juan Basin Cumulative Overview and Comment Letter document contains an analysis of the effects caused by the interaction of the proposed coal development, the New Mexico Generating Station and wilderness study proposals. Therefore, the Final EIS consists of this document, the Final San Juan Basin Cumulative Overview and the maps of both Draft documents.

For further information contact: Lee V. Larson
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Date Filed with EPA -



State Director, BLM New Mexico

SAN JUAN RIVER REGIONAL COAL EIS

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PREFACE

Seven tracts (Pinehaven, Lee Ranch East, Breadsprings #1 and #2, Hogback, Chico Wash South, and Gamerco #2) lacked sufficient cultural inventory data to adequately analyze potential impacts. These tracts may not be recommended for further consideration for leasing by the RCT until identified problems are resolved.

They could be reconsidered for possible leasing in subsequent environmental statements in the next activity planning cycle.

Most of these seven tracts have other significant social, economic or physical deterrants to leasing as follows:

Lee Ranch East - The surface owner has formally refused to allow entry even for a limited purpose of inventory data collection.

Chico Wash South - The results from recent exploration have not been fully analyzed but no substantial coal reserves were found by the exploration. The tract lacks thick coal beds and is relatively isolated from potential coal transportation. The tract is contiguous to the Ignacio Chavez Grant.

Gamerco #2 (IC) - Analysis of additional proprietary data from recent exploration in the general area of the tract indicates that there is very little chance that coal thick enough and continuous enough for underground mining exists on the tract. Even if the coal existed it would not be economically competitive in the near future. Numerous dwellings exist on the tract and surface owner consent is likely to be difficult to obtain.

Pinehaven - The tract contains small amounts of coal resources and the coal is thin and discontinuous. The tract is a long distance from the nearest railroad. Numerous dwellings on the tract along with the complicated surface ownership is likely to make surface owner consent extremely difficult to obtain.

Hogback - The tract contains only a small amount of hypothetical resources and contains numerous dwellings. Commercial buildings and the Gallup High School are adjacent to the tract. Access and surface owner consent are likely to be very difficult to obtain.

Bread Springs #1 and #2 - These tracts contain small amounts of resources and hypothetical resources. There is not likely to be sufficient coal present in the area to support an underground mine and such coal would not be economically competitive in the near future. Numerous dwellings exist on the tracts and surface owner consent and access is likely to be difficult to obtain.

SUMMARY

SUMMARY

This statement assesses the environmental consequences of four alternative levels of competitive coal leasing and developments, and the issuance of 26 Preference Right Lease Applications. The alternatives range from no competitive leasing to leasing 39 tracts, 1.94 billion tons. The Minimum Surface Owner Alternative, consisting of 11 tracts .916 billion tons (.349 billion tons recoverable Federal coal), is the preferred alternative. The alternatives to the PRIA Issuance is exchange or legislation. Issuing all 26 PRLAs has been chosen as the preferred alternative.

The new leasing target of 800 to 900 million tons of in-place Federal coal (300 to 400 million tons of Federal recoverable coal, preferred alternative) was recommended by the Regional Coal Team on April 27, 1983. This target was the direct result of negotiations between the State of New Mexico and the Bureau of Land Management and resulted in an approximate 40% reduction from the original proposed target alternative of 1.2 to 1.5 billion tons. It was established as the new leasing level by the Secretary on July 14, 1983.

A Site-Specific Analysis (SSA) was prepared by the BIM for each tract and served as the basis for tract ranking and alternative formulation by the RCT. These SSAs, are incorporated in this document by reference and are summarized in Appendix A-1 of this EIS. Site specific analysis of the individual PRIA's is available in the PRIA EA (BLM, 1979).

GENERAL CONCLUSIONS

Analysis generally shows that the already projected development (No Action) and Preference Right Lease Issuance will have considerable impacts. Most impacts, which can be attributed to new Federal leasing, gain their significance by adding to an already stressed situation.

The alternatives do not differ from one another by the nature of impacts, only in magnitude. The alternatives will produce impacts generally in proportion to the coal produced. The magnitude of these impacts tend to be diminished when measured across the entire San Juan River region, but are compounded when measured locally.

The four competitive leasing alternatives, the No Action Alternative and Preference Right Lease Issuance, would further commit the region to an economic base of energy minerals, i.e. coal, oil and gas, and uranium. Therefore, the stability of the region's economy will, more than ever, revolve around the cycles of the nation's energy minerals industry.

The major environmental issues after extensive public review and comment are: (1) the availability of sufficient water for reclamation and mining, (2) the potential success of reclamation efforts, (3) the long-term

scientific information losses to be incurred from destruction of cultural and paleontological resources, and if the information gained through excavation, extraction, and study of these resources will be of greater value than the losses incurred and (4) the extent to which the proposed actions affect traditional lifestyle of nearly 22,000 Navajos living in the region. These major issues are very controversial and are not completely resolved. The need for coal leasing in a depressed market is also a major issue but is not included in the analysis of this statement because it is beyond the scope of this EIS.

The alternatives are analyzed with emphasis on the significant primary and secondary impacts. The discussion of the impacts is commensurate with the significance of the issues.

NO ACTION ALTERNATIVE

This alternative proposes no competitive leasing of federal coal. Even with no additional leasing, portions of the San Juan River Coal Region will continue to be an active coal producing area. Present yearly production is approximately 17.9 million tons. Production potential could increase to 40 million tons by 1987.

This alternative covers the development of a coal resource base of approximately 3 billion tons in-place coal on existing private, state, federal and Indian leases and associated major federally approved projects. Approximately 1 billion tons of this is under contract commitments. This alternative does not include the PRLAs.

No substantial changes in the climate of the region are expected from this alternative. Air pollution from mining and indirect development would be local and not significantly affect air quality except in the immediate vicinity of potential coal development.

Alteration of topography on nearly 25,000 acres would occur as a result of this alternative. Coal production would not generally interfere with exploration or extraction of oil and gas or other minerals. Approximately 1,100 fossil collection sites could be destroyed, but some subsurface fossil information would become available during mining. Soil mixing, contamination, compaction and short-term acceleration of erosion would occur.

A need for approximately 3,600 acre-feet per year of water and some changes in water quality would occur.

Actual revegetation experience in the San Juan Basin is limited to two mines and a few study plots. Revegetation efforts at these mines and study plots have shown that revegetation can be accomplished. Even with revegetation being achieved to a certain degree, it has not existed for sufficient time to evaluate fully whether the reestablished vegetative community will be capable of self-regeneration and plant succession; and long-term plant diversity is still questionable. However, strict reclamation regulations enforced by the Office of Surface Mining and Mining Minerals Division, New Mexico Energy and Minerals Department would be adhered to.

Land use patterns are expected to shift from agriculture toward mining and semi-urbanization even without additional coal leasing. Several ranches could lose all or a part of their grazing privileges. These losses should be compensated somewhat by fees paid by the mines for the use of private or Indian lands. Vegetation would be removed on nearly 25,000 acres and 3,157 AUMs (less than 1% in the Chaco Planning Unit) would be lost during active mining and before reclamation is complete. Wildlife habitats would also be lost during the period before reclamation is complete.

Development projected without further Federal coal leasing could disrupt a predicted 470 to 950 cultural resource sites. Sacred sites and gravesites important to the Navajo people could be disturbed or destroyed, although measures would be taken to minimize adverse effects.

Dispersed recreational opportunities, such as camping and fishing, are ample throughout the region. The decrease in the quality of these experiences, because of the increased population expected under the No Action Alternative, is expected to be minimal.

Most of the mining considered in this EIS would severely disfigure the landscape, which would not be fully reclaimed for 10 to 20 years after the end of mine life. These lands are not given a high Visual Resource classification and in most cases are infrequently seen by persons not involved in mining, so the degradation of visual quality would not be obvious. Some mining would occur adjacent to major highways and in those places visual quality would be significantly diminished.

Three wilderness study areas exist in the region. Generally, these areas can absorb the additional use anticipated by population growth but some individuals feel that their wilderness experience could be diminished.

Some social-structural and social-psychological disruption would be caused by rapid population growth. Tension between established residents and newcomers can be expected and alcoholism, mental disorders, and crime are predicted to increase.

Income and employment opportunities would increase. This would stimulate the local economy and support otherwise economically prohibitive but personally rewarding life styles such as hobby ranching. On the other hand, this increased income would generate local inflation and create serious hardships for lower paid workers and those on fixed incomes.

New Mexico generally has adequate transportation capacity to handle the presently projected development. Hauling coal by truck could increase road maintenance costs, even beyond what could be collected through regular fees. Most of the coal would be transported by rail.

Increased child and spouse abuse, neglect, mental health, alcohol and drug abuse, and injuries from assaults are expected to occur due to the changes that mining will have on the values, beliefs and the traditional lifestyle of the Navajo people.

It is likely that jobs with higher income would be made available to Navajos thus reducing the current high rate of Navajo unemployment. Navajos who

are relocated will receive compensation for the loss of or damages to property from the mining companies.

PREFERENCE RIGHT LEASE ISSUANCE

The discussion presented under this action includes the impacts of the No Action Alternative.

This separate action covers the issuance of 26 PRLA's and development of an estimated 2.3 billion tons of federal coal contained in the 26 PRLAs. Approximately 5.3 billion tons of in-place coal reserves would be available under this action and the No Action Alternative, but considerably less is expected to be developed. The preferred action is to issue all 26 PRLAs with the currently proposed lease terms and conditions (Appendix I-2).

No substantial changes in the climate of the region are expected from this alternative. Air pollution from mining and indirect development would be local and not significantly affect air quality except in the immediate vicinity of potential coal development. Population and transportation growth which will accompany mining will have a greater effect on regional air quality than the mining itself.

Alteration of topography on nearly 47,020 acres would occur as a result of surface and subsurface mining. Coal production would not generally interfere with exploration or extraction of oil and gas or other minerals. Approximately 2,237 fossil collection sites could be destroyed, but subsurface fossil information would become available during mining. Soil mixing, contamination, compaction and short-term acceleration of erosion would occur.

A need for approximately 16,450 acre-feet per year of water and some change in water quality would occur.

Actual revegetation experience in the San Juan Basin is limited to two mines and a few study plots. Revegetation efforts at these mines and study plots have shown that revegetation can be accomplished. Even with revegetation being achieved to a certain degree, it has not existed for sufficient time to evaluate fully whether the reestablished vegetative community will be capable of self-regeneration and plant succession; and long-term plant diversity is still questionable. In addition, since the lands have not been subject to grazing pressure, their tolerance for grazing use is uncertain. However, strict reclamation regulations enforced by the Office of Surface Mining and Mining Minerals Division, New Mexico Energy and Minerals Department would be adhered to.

Land use patterns are expected to shift from agriculture toward mining and semi-urbanization even without additional coal leasing. Several ranches could lose all or a part of their grazing privileges. These losses should be compensated somewhat, by fees paid by the mines for the use of private or Indian lands. Vegetation would be removed on nearly 47,020 acres and 5,198 AUMs (less than 1.6% in the Chaco Planning Unit) would be lost during active mining and before reclamation is complete. Five ferruginous hawks, a prairie falcon and

their nests could be disturbed. Other wildlife habitats would also be lost during the period before reclamation is complete.

A total of 171 cultural resource sites have been found in the PRLAs, and 1,012 to 1,492 are predicted to occur. Many of these sites are very significant, however, regulations largely protect these resources. Sacred sites and unidentified gravesites important to the Navajo people could be disturbed or destroyed, although measures would be taken to minimize adverse effects.

Dispersed recreational opportunities, such as camping and fishing, are ample throughout the region, but the quality of these experiences may be diminished because of the increased population expected to enter the area.

Most of the mining considered in this EIS would severely disfigure the landscape, which would not be fully reclaimed for 10 to 20 years after the end of mine life. These lands are not given a high Visual Resource classification and in most cases are infrequently seen by persons not involved in mining, so the degradation of visual quality would not be obvious.

Three wilderness study areas exist in the region. Generally these areas can absorb the additional use anticipated by population growth but some individuals feel that their wilderness experience would be diminished.

Continuous increases in population are expected, which could significantly change the social structure of the area and impose a heavy financial burden on most communities and individuals.

Many of the communities will have to obtain funds from outside the region to meet population demands. Such public services as schools, sewers, fire protection and police would all have to be expanded. Even if funding is obtained, these services would be insufficient from time to time because of rapid or unexpected growth. Housing would be expensive and in short supply. The opposite would occur to the housing market if demand for coal suddenly dropped.

Some social-structural and social-psychological disruption would be caused by rapid population growth. Tension between established residents and newcomers can be expected and alcoholism, mental disorders, and crime are predicted to increase.

Income and employment opportunities would increase. This would stimulate the local economy and support otherwise economically prohibitive but personally rewarding life styles such as hobby ranching. On the other hand, this increased income would generate local inflation and create serious hardships for lower paid workers and those on fixed incomes. Some labor intensive industries, such as agriculture, which are unable to pay high wages would find it difficult to compete for labor. Some small businesses would be phased out, thus placing the region's economic stability in the cyclic patterns of the coal industry.

New Mexico generally has adequate transportation capacity to handle the presently projected development. Hauling coal by truck could increase road maintenance costs, even beyond what could be collected through regular fees. Most of the coal would be transported by rail.

Increased child and spouse abuse, neglect, mental health, alcohol and drug abuse, and injuries from assaults are expected to occur due to the changes that mining could have on the values, beliefs and the traditional lifestyles of 39 Navajo families. With an influx of people from outside the region, ethnic and cultural clashes are expected to occur. Many of the Navajos will not benefit financially from coal development and yet would suffer from price inflation accompanying the boom. Traditional grazing practices would be interrupted for livestock operators. The destruction of sacred sites and gravesites could also add to the measure of mental illness that is expected to occur. Relocation of Navajo families from homesites that they have occupied for generations will increase measures of illness.

It is likely that jobs with higher income would be made available to Navajos thus reducing the current high rate of Navajo unemployment. The Navajo standard of living would be improved if they could occupy these jobs. Navajos who are relocated will receive compensation for the loss of or damages to property from the mining companies.

ALTERNATIVE I: EXCHANGE OR LEGISLATION

a. Total Exchange or Legislation

If issuance of the Preference Right Lease (PRL) is found to be not in the public interest, all Preference Right Lease rights could with the consent of the applicant be exchanged or otherwise transferred. This would eliminate all of the environmental and social effects of coal mining on the subject tracts as well as all of the economic benefits including increased state revenues.

This alternative could reduce the potential overall regional coal production levels, unless the applicant used the certificate on a tract that did not receive a bid, thereby lowering the potential for cumulative disturbance of all resources.

b. Exchange or legislation for Selected PRLAs

Under this subalternative, the Bureau would pursue exchanges or other extinguishment of PRLA rights for particular PRLAs which present significant or unusual environmental effects. Numerous possibilities exist, several specific possibilities are; 1) exchange for PRLAs with Navajo Occupancies, 2) exchange for PRLAs with special paleontological values, i.e. fossil forest, and 3) exchange for the Ah-shi-sle-pah WSA.

The effects of this subalternative would be to prevent mining on portions of these tracts and all attendant environmental and socio-economic impacts. The main benefits to this subalternative would be to 1) eliminate a major conflict between the 39 Navajo families living in the area and coal production, 2) retain paleontological rich lands, i.e. fossil forest, in their current status to allow prolonged, periodic scientific study and 3) preserve the wilderness qualities within the WSA boundaries of Ah-shi-sle-pah.

This subalternative would make unavailable over 350 million tons of coal.

The following discussion summarizes specific impacts of the above examples of partial PRLA lease issuance. It includes the impacts of the No Action Alternative. The same type of impacts are expected to occur under this subalternative, they differ only in magnitude. Some reduction in visual quality would occur, however, the air quality standards are not expected to be exceeded.

Approximately 40,435 acres of topography would be disturbed as a result of surface and subsurface mining. Disturbance or destruction of approximately 2,176 fossil localities could occur.

Approximately 40,435 acres of vegetation, soils, topography and wildlife habitat will be temporarily disturbed and 515 acres could be removed by facilities construction. Subsidence could occur on approximately 28,270 acres.

A need for approximately 15,875 acre feet of water per year and a change in water quality and quantity would occur.

An estimated 4,935 AUMs would be temporarily lost until reclamation is completed.

Approximately 434 cultural resources sites and 470-950 predicted sites are located in the area referred to by this alternative, they could be destroyed.

Mining would reduce the scenic values on a total of 15,435 acres. The quality of the recreational experience when participating in recreation activities, such as camping and fishing may diminish due to crowding from the increase in population within the EIS Region.

Traffic accidents would increase by more than 89 and average daily traffic by more than 4,190 in the year 2000.

On 11 known gravesites the lessee would need permission to move the gravesites or an area 100 feet surrounding the gravesite would be left unmined. Unknown gravesites would be destroyed if not identified.

Four known sacred sites and an unknown number of sites could be destroyed by surface mining.

Employment in the year 2000 could increase in Farmington and Cuba by 5,191 (16%) and 1,731 (324%), respectively. Population could increase by 1,923 (116%) in Cuba in the year 2000. Fourteen Navajo families occupying the PRLA area and adjacent land would be relocated.

BYPASS ALTERNATIVE

The discussion presented under this alternative includes the impacts of the No Action Alternative and Preference Right Lease Issuance. The same type of impacts are expected to occur under this alternative; they differ only in magnitude.

This alternative would allow the competitive leasing of 129 million tons of in-place federal coal from eight tracts. Mining of these tracts would be in conjunction with the mining on adjacent existing leases and PRLAs. Leasing coal from these tracts would only slightly increase annual production, and would have little economic or social impacts other than to lengthen the period of mining by a few years. Approximately 5.4 billion tons of in-place coal reserves would be available under this Alternative, but considerably less is expected to be developed.

Analysis shows that under full production and worst-case analysis the New Mexico's 24-hour air quality standard for total suspended particulates would be slightly exceeded (by 13 ug/m³). However, due to the strict regulations placed on mining permits and enforcement by State and Federal agencies these air quality standards would not be expected to be exceeded..

Alteration to topography on approximately 53,150 acres would occur as a result of surface and subsurface mining. Approximately 2,508 fossil localities would be disturbed or destroyed.

A need for approximately 16,830 acre-feet of water per year and some change in water quality would occur.

Vegetation would be removed on approximately 53,150 acres and 5,801 AUMs would be lost during mining and before reclamation is complete. This represents 1.8 percent of the AUMs in the Chaco Planning Unit.

Up to 200 acres (<1%) of deer and elk winter range would be destroyed for the life of the mines and until reclamation occurs. Nests of six ferruginous hawks, and a prairie falcon could be disrupted.

Of the 1,148 to 1,680 cultural resource sites predicted to occur 199 sites have been found.

Approximately forty-three(43) Navajo families would be relocated under this alternative. Their lives could be substantially disrupted.

MINIMUM SURFACE OWNER CONFLICTS ALTERNATIVE

This is the preferred alternative of the Regional Coal Team (RCT) as adopted on April 27, 1983. The discussion presented under this alternative includes the impacts of the No Action Alternative and Preference Right Lease Issuance. The same type of impacts are expected to occur under this alternative.

This alternative consists generally of tracts that require no surface owner consent, or for which consent has been given. Under this alternative, 916 million tons of in-place federal coal from 11 tracts would be offered for competitive lease. Approximately 6.2 billion tons of in-place coal reserves would be available under this Alternative, but considerably less is expected to be developed.

Under full production and worst-case analysis, New Mexico's 24-hour air quality standard for total suspended particulates could be exceeded by 84 ug/m³. However, due to strict enforcement by State and Federal agencies these air quality standards would not be expected to be exceeded.

Alteration of topography on approximately 66,322 acres would occur as a result of surface and subsurface mining. Approximately 2,373 fossil localities could be disturbed or destroyed. This is fewer fossil localities than the Bypass Alternative however some federal coal would be bypassed under this alternative. No new impacts to wildlife species of high federal interest would occur under this alternative.

A need for approximately 18,950 acre-feet of water per year and a change in water quality would occur.

Vegetation would be removed on nearly 66,327 acres and 9,466 AUMs would be lost during mining and before reclamation is complete. This represents 3 percent of the AUMs in the Chaco Planning Unit.

Three-hundred and eighty-four cultural resource sites have been found and 1,612 to 2,200 sites are predicted to occur.

Approximately sixty-two (62) Navajo families would be relocated under this alternative. Their lives could be substantially disrupted.

This alternative would also disperse the socioeconomic impacts by providing a high proportion of development away from Farmington compared to the other alternatives.

TARGET ALTERNATIVE

The discussion presented under this alternative includes the impacts of the No Action Alternative and Preference Right Lease Issuance. The same type of impacts are expected to occur under this alternative; they differ only in magnitude.

Overall, destruction or disturbance of resources under this alternative would be much greater than those discussed under the Bypass or Minimum Surface Owner Conflicts Alternative.

This alternative would allow the competitive leasing of 1.32 billion tons of in-place federal coal from 24 tracts. Approximately 6.6 billion tons of in-place coal reserves would be available under this Alternative, but considerably less is expected to be developed.

Under full production and worst-case analysis the New Mexico's 24-hour air quality standard for total suspended particulates could be exceeded by 84 ug/m³. However due to strict enforcement by State and Federal agencies these air quality standards would not be expected to be exceeded.

Alteration of topography on approximately 82,997 acres would occur as a result of surface and subsurface mining. Approximately 3,637 fossil localities could be disturbed or destroyed.

A need for approximately 20,150 acre-feet of water per year and a change in water quality would occur.

Nests of six ferruginous hawks, a prairie falcon, and two golden eagles could be disrupted. Other wildlife habitat would also be destroyed.

Vegetation would be removed on nearly 82,997 acres and 11,243 AUMs would be lost during mining and before reclamation is complete. This represents 3.4 percent of the AUMs in the Chaco Planning Unit.

Five hundred and eighty-three cultural resource sites have been found and 1,826 to 2,597 are predicted to occur.

Approximately one-hundred and nine (109) Navajo families would be relocated under this alternative. Their lives could be substantially disrupted.

HIGH ALTERNATIVE

The discussion presented under this alternative includes the impacts of the No Action Alternative and Preference Right Lease Issuance. The same type of impacts are expected to occur under this alternative; they differ only in magnitude. The impacts associated with the leasing level of this alternative would be nearly double those of the Target Alternative.

Under this Alternative, 1.94 billion tons of in-place federal coal would be competitively offered for lease from 39 tracts. Approximately 7.2 billion tons of in-place coal reserves would be available under this alternative, but considerably less is expected to be developed.

Under full production and worst-case analysis the New Mexico's 24-hour air quality standard for total suspended particulates could be exceeded by 86 ug/m³. However, due to strict enforcement by State and Federal agencies these air quality standards would not be expected to be exceeded.

Alteration of topography on approximately 115,661 acres would occur as a result of surface and subsurface mining. Approximately 3,930 fossil localities could be disturbed or destroyed.

A need for approximately 21,100 acre-feet of water per year and a change in water quality would occur.

Six ferruginous hawks, a prairie falcon, and two golden eagles and their nests could be disrupted. Other wildlife habitat would also be destroyed.

Vegetation would be removed on nearly 115,661 acres and 15,175 AUMs would be lost during mining and before reclamation is complete. This represents 4.6 percent of the AUMs in the Chaco Planning Unit.

Eight hundred and nine cultural resource sites have been found and 2,739 to 3,787 are predicted to occur.

Approximately four-hundred and ninety four (494) Navajo families would be relocated under this alternative. Their lives could be substantially disrupted.

A comparison of the impacts of each alternative and PRLAs is located at the end of Chapter 1 (Refer to Table 1-7 and 1-8). A detailed assessment of the PRLAs and alternatives is found in Chapter 3 of this document.

CHAPTER 1

DESCRIPTION OF THE ALTERNATIVES

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DESCRIPTION OF THE ALTERNATIVES

INTRODUCTION

In June of 1979, the Secretary of the Interior adopted a new program for the management of coal resources on federal lands. Information from the Department of Energy as well as the coal mining and consuming industries was used to estimate the demand for new federal coal leasing. Land use plans, industry data, environmental analyses, and the concerns of the public and federal, state and local officials are now being used to identify specific coal lease tracts to supply that demand.

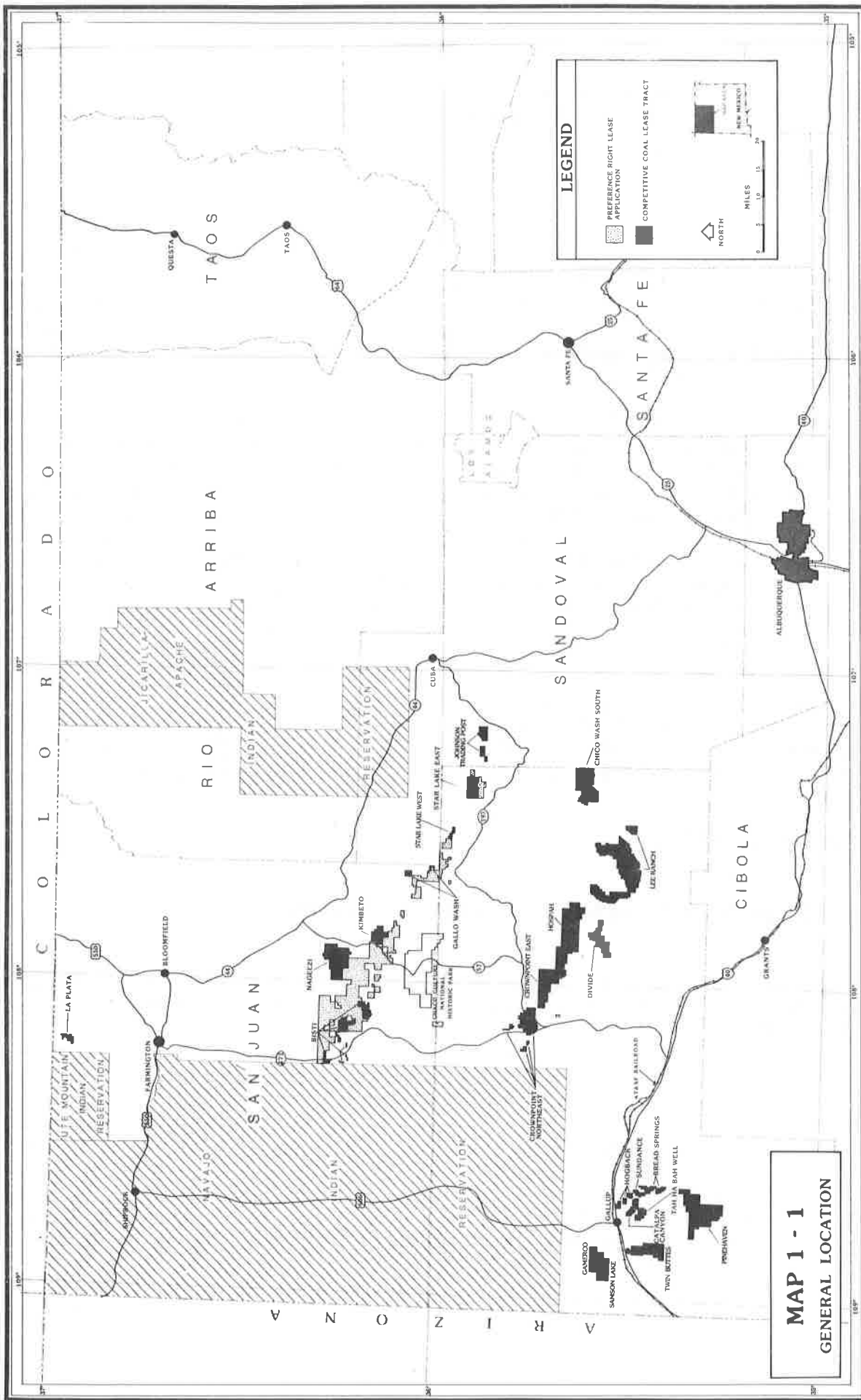
The nation's coal reserves have been divided into twelve regions scattered throughout the continental United States. This Environmental Impact Statement (EIS) addresses the environmental consequences of four leasing alternatives in the Bureau of Land Management's (BLM's) San Juan River Coal Region, which encompasses northwest New Mexico and southwest Colorado (refer to Map 1-1, next page, and Visual A, which was enclosed with this document draft EIS. This EIS will be used with other relevant material by the Department of the Interior (DOI) to plan actions and make decisions with respect to federal coal leasing in the region.

The basic coal program is fully described in the following DOI publications: the Final Environmental Statement: Federal Coal Management Program 1979; Federal Coal Management Program - A Narrative Description (1979); in Secretarial Issue Document - Federal Coal Management Program (1979). Further information can be found in the federal coal management regulations (43 CFR 3400) including revisions made to the original program. These documents are available for public review at the Albuquerque District Office and the Farmington Resource Area Office.

NEED FOR LEASING IN THE REGION

The need for a federal coal leasing program was established and documented in the Final Environmental Statement: Federal Coal Management Program (USDI, BLM 1979), and Department of Energy production goals.

Using the program procedures, in April 1982, the Secretary of the Interior selected a leasing target of 1.2 to 1.5 billion tons of in-place federal coal for lease sale in December 1983, for the San Juan River Region. In July 1983, the Secretary revised the target downward to 800 to 900 million tons of in-place federal coal (300 to 400 million recoverable as proposed) subject to identification of those tracts with the least social, environmental and economic costs. This was based on recommendations of the Regional Coal Team and the Governor of New Mexico. This target was established after extensive public hearings, analyzing potential production from planned and existing coal mines in the region, and consultation with state and local officials and the Departments of Energy and Justice. The target is intended to



ensure that federal coal is available to aid in satisfying anticipated coal demand in the region, to ensure competition among coal producers and to meet the country's energy needs. After the EIS is published, the question of the proper leasing level will again be considered both by the RCT and the Secretary. The final analysis will be based on the latest available information on the factors listed in 43 CFR 3420.2(c), and the environmental concerns discussed in this document.

The level of actual need, the level of leasing, and the level of production within a specific coal region are still subject to the uncertainties of coal demand and the environmental acceptability of mining technologies and level of development. The actual level of development in this region will be determined by the coal market. Prior to mining, permits are subject to federal and state review of individual resource recovery and protection plans and permit application (mine plan).

While the first regional sale has been tentatively scheduled for summer 1984, no decision has been made as to whether all the tracts selected by the Secretary would be sold at one time or in staggered sales. This should have no appreciable affect on the development time frame used in this analysis or impacts under any alternative.

Also included in this document is the proposed action on issuing leases for approximately 2.3 billion tons of in-place federal coal from 26 Preference Right Lease Applications. Although the Federal Coal Leasing Amendments Act no longer allows non competitive new leasing NRDC v. Bergland established that the Secretary must process the PRLAs to issuance or rejection of the lease.

The alternatives presented in this EIS are analyzed to identify the type and extent of the impacts of competitively leasing various levels of federal coal and options for the Preference Right Lease Applications.

PROGRAM IMPLEMENTATION TO DATE

Following completion of the Chaco/San Juan transition MFP for coal, which considered input from the state, industry, and public sectors, the BLM issued a call for expressions of leasing interest from the public. In addition, qualified surface owners overlying federal coal reserves were offered the opportunity to refuse to allow mining of these coal reserves in exercise of their right under the Surface Mining Control and Reclamation Act of 1977 (SMCRA).

A Regional Coal Team (RCT) was formed in October 1980 with BLM and state officials to oversee the leasing process and make recommendations to the Secretary of the Interior regarding leasing actions and regional leasing targets. A series of meetings open to the public was held by the RCT to consider: surface owner refusals to allow mining, industry interest in leasing and development, energy needs for the region, and the type of geologic and mining information to be used by the former Minerals Management Service (MMS) to delineate specific tracts for potential leasing.

The MMS then prepared tract summary reports that the BLM used to prepare a site-specific analysis (SSA) for each of the 50 tracts that MMS

delineated. (Refer to Appendix A-1 for summaries of the SSAs). The RCT analyzed these SSAs and ranked the tracts based on coal economics, and environmental, social, and economic impacts. From this analysis 39 tracts were carried forward and the RCT formulated leasing alternatives along with the No Action Alternative, consisting of varying levels of production and combinations of tracts to be assessed in this EIS.

The Secretary of the Interior may select an array of tracts or a resource quantity intermediate in magnitude to those analyzed. This could be developed through changes in the proposed level of leasing, different tract combinations, alteration of tract boundaries, changes in the lease sale schedule, or modification of the leasing target. These alternatives could be developed in response to expressed preferences of the Governors of New Mexico and Colorado, the analysis in the EIS, recommendations of the RCT, Indian Tribes, Department of Justice DOJ, public input, and coordination with other federal agencies.

In addition to competitive coal leasing, issuance of 26 Preference Right Lease Applications (PRLAs) are addressed in this EIS. These were reviewed in the Environmental Assessment for Coal Preference Right Leasing, New Mexico (USDI, BLM 1981).

Further information on the implementation of the federal coal program in the region and the history and background leading to the publication of this EIS is found in Appendices A-2 and A-3.

DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

No Action Alternative

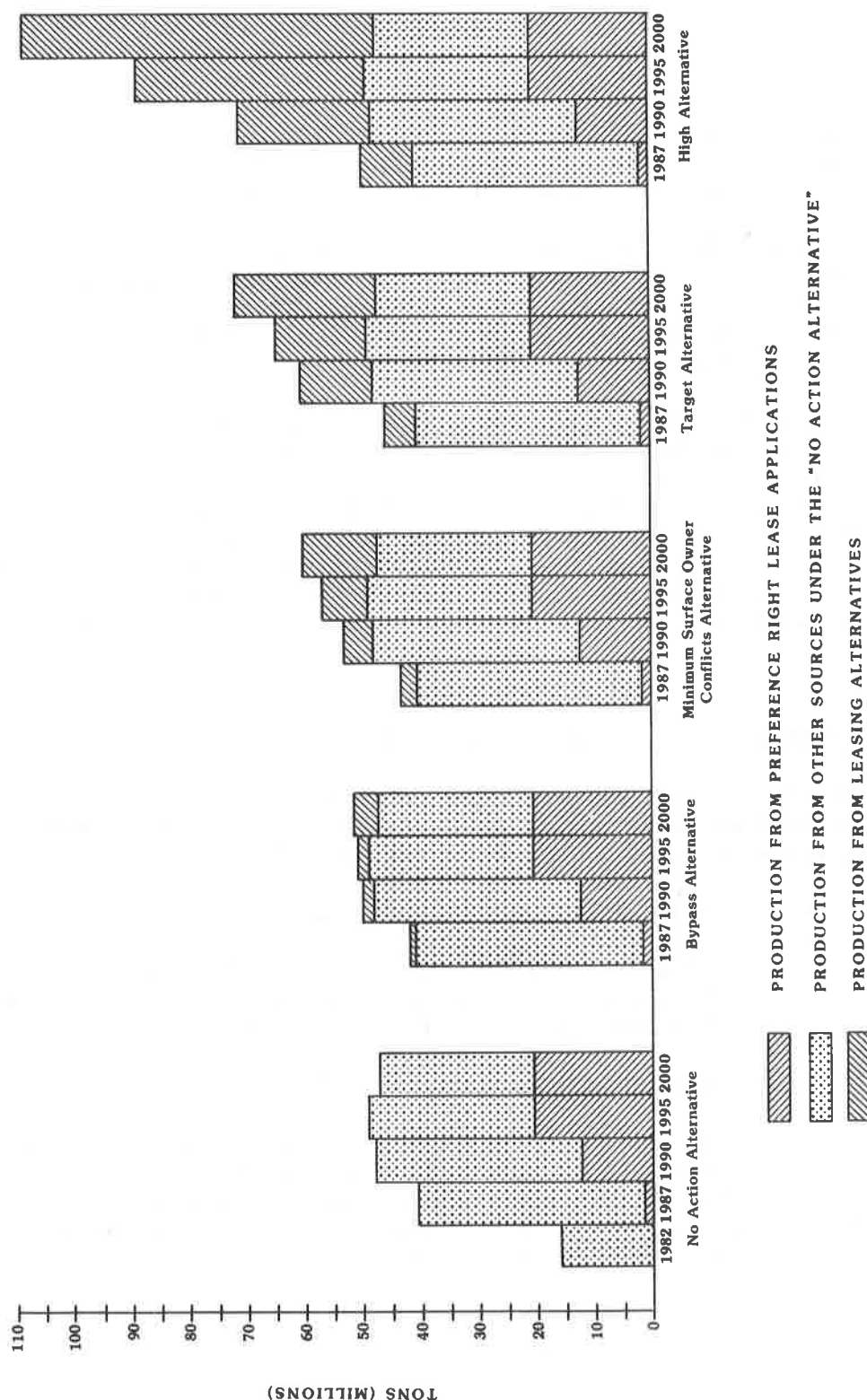
The No Action Alternative proposes no new leasing of federal coal. This alternative does not include issuance of the PRLAs. However, it should be noted that the Department is under an obligation to fully adjudicate all pending PRLAs. Even with no additional leasing, portions of the San Juan River Coal Region will continue to be active coal producing areas.

Coal production under this alternative would result from privately owned coal and existing state, federal and Indian leases. Approximately 3 billion tons of in-place reserves are in this category; approximately 2 billion of this is under a filed mine plan and 1 billion under contract commitment. Existing and planned mines considered are Navajo, Burnham, McKinley, South Hoshpah, De-na-zin, Gateway, Lee Ranch, Mentmore, Arroyo #1, Gallo Wash Alamito (Tuscan Gas and Electric), Black Diamond, La Ventana, San Juan, La Plata, Star Lake, Black Lake, Bisti and several mines in Colorado. Many of the filed mine plans are not current and may require repermitting before full development. Projected coal production in 1987 and the year 2000 would be approximately 39.4 and 26.5 million tons, respectively (refer to Figure 1-1). Coal baseline figures were derived under consultation with state and federal agencies.

Federally approved projects include the Animas-La Plata Irrigation Project, Star Lake Railroad, Fruitland Coal Load Transmission Line.

Approximately 25,000 total acres would be disturbed under this alternative. Acres disturbed in the years 1987 and 2000 are 8,000 and 16,000 respectively.

FIGURE 1-1
COAL PRODUCTION BY ALTERNATIVE FOR 1987, 1990, 1995, AND 2000



Preference Right Lease Issuance

This action proposes no new competitive leasing of federal coal. Coal production could result from lease issuance of 26 pending PRLA units (refer to Table 1-1). It also addresses the environmental effects of mining the 26 PRLAs with the currently proposed leased terms and conditions, Committed Mitigation and the Additional Mitigation Measures that significantly mitigate regional impacts on the environment. The Preference Right Lease Issuance (26 PRLAs, and 1.15 billion tons of recoverable federal coal) is the preferred alternative for the PRLAs. The PRLAs are shown in Visual C which was enclosed with the draft EIS. All but two of the seven PRLA units would be surface mined.

The PRLA subalternative (Alternative Lease Terms) that was in the second draft has been incorporated into the Preference Right Lease Issuance Alternative and is no longer discussed separately in this document. However, additional stipulations may be developed at the mine plan stage when more site specific information will be available.

The Department of the Interior has full discretion to include in leases issued to PRLA holders, lease terms which are required to protect the public interest. If, after consideration of all expected costs including the cost of lease term compliance, the Department concludes that the PRLA holder has discovered coal in commercial quantities, a lease must be issued to the PRLA holder. The options also exist to negotiate and exchange for bidding rights on competitive tracts or resolve legislatively the rights of the PRLA holder. This option is addressed as an alternative under Preference Right Lease Issuance as follows:

Alternative I: Exchange or Legislation

This section also considers the environmental effects of two sub-alternatives which would result in the elimination of mining for all or a portion of the PRLAs and are as follows:

a. Exchange or Legislation for some or all of the PRLAs

The Bureau could pursue exchanges of PRLA rights or appropriate legislation for all or part of the PRLAs if it is determined that coal mining is not in the public interest.

b. Exchange or Legislation for Selected PRLAs

Under this subalternative, the Bureau would pursue exchanges of PRLA rights or appropriate legislation for portions of particular PRLAs which present significant or unusual environmental effects. Numerous possibilities exist for exchange or legislation.

Some specific examples are:

1. Exchange or Legislation for PRLAs with Navajo occupancies.
2. Exchange or Legislation for PRLAs with Special Paleontological Values or in the Ah-she-sli-pah Wilderness Study Area.

TABLE 1-1
ESTIMATED DEVELOPMENT DATES FOR THE
PRLAs IN THE SAN JUAN RIVER REGION
(PREFERENCE RIGHT LEASE ISSUANCE)

Company	PRLA No.	Type of Mine	Initial Construction	Initial Production
Eastern Assoc.	NM 3836 <u>1/</u> NM 3835 NM 6802 NM 7235	Surface	1989	1990
Eastern Assoc. & Kinark-North	NM 6801 NM 3834 NM 3838 NM 11916	Underground	1989	1990
Eastern Assoc. - South	NM 6803 NM 3836 <u>1/</u> NM 3837 NM 6804	Underground	1989	1990
Arkland #1	NM 3752 NM 3753 NM 3754 NM 3755 <u>2/</u>	Surface	1986	1987
Arkland #2	NM 3755 <u>2/</u> NM 3919 NM 3918 NM 8745	Surface	1988	1989
Thermal Energy Company	NM 9764 NM 8128 NM 8129 NM 8130 NM 8715 NM 8717 NM 11670	Surface	1986	1987
Freeman United	NM 585	Surface	1986	1987

Note: 1/ This PRLA covers both a surface and an underground mine.
2/ This PRLA is split into two mining units.

The San Juan River Regional Coal Team held a meeting on April 27, 1983. Because of the support for wilderness designation for the Ah-shi-sle-pah Wilderness Study Area (WSA) by other groups, including the State of New Mexico, the Regional Coal Team directed BLM to consider the impacts of exchanging the PRLA's located in this WSA. A subgroup of the Regional Coal Team composed of the BLM and representatives from the State of New Mexico studied the exchange. This report when final is available at the Farmington Resource Area and Albuquerque District Office.

The purpose for analyzing the PRLAs is to consider lease terms and conditions under which the lease will be granted. Where the Secretary determines that coal development, would not be in the public interest on a Preference Right Lease Application or portion thereof, a PRLA may be relinquished in exchange for: 1. a new coal lease (with Congressional authorization), 2. issuance of coal lease bidding rights of equal values or, 3. Federal coal lease modifications such as: Legal requirements allow the BLM to substitute up to 160 acres of coal land adjacent to the PRLA tract, without resource conflicts, for the portion of the PRLA being relinquished.

In-place reserves for the 26 PRLAs are approximately 2.3 billion tons, with 1.15 billion tons being recoverable. Projected coal production in 1987 and the year 2000 would be approximately 1.6 and 20.5 million tons, respectively (refer to Figure 1-1). Total PRLA recoverable reserves cannot be directly determined from the total annual PRLA production rate because some PRLA holders have more than one Logical Mining Unit (LMU). A LMU is defined as a tract or tracts of land where the recoverable reserves can be mined out within 40 years.

Approximately 22,020 total acres would be disturbed under this Alternative. Before reclamation, surface mining would disturb approximately 1,500 acres in 1987 and 10,000 acres in the year 2000 on the PRLAs. Approximately 705 acres would be disturbed on PRLA mining units by onsite surface facilities, including coal and topsoil storage acres, haul, and access roads, and power and telephone lines. The site specific impacts, by individual PRLAs, as identified in the Final Environmental Assessment for Coal Preference Right Leasing, New Mexico (USDI, BLM, 1981b), are incorporated by reference into this document and are summarized in Appendix A-6 and in Chapter 3 generally.

Bypass Alternative

Under this alternative eight competitive tracts would be offered for lease sale. These would be surface mined (refer to Table 1-2). These eight tracts are located next to existing and proposed mines and PRLAs (refer to Table 1-3). It is assumed that the tracts would not be mined (would be bypassed), unless adjacent mining operations extend into them. If the tracts were mined, the construction, mining and coal transportation personnel would be the same personnel working on operating mines adjacent to the tracts. Construction would begin between 1984 and the year 2009, with production starting during the second year of construction. Surface mines would require 4 years for construction.

Federal in-place reserves that would be offered for lease total approximately 129 million tons, of which 113 million tons would be recoverable. Projected coal production would be approximately 1.63 million tons from four tracts in 1987 (start-up) and 3.75 million tons from four tracts for the year

TABLE 1-2

COMPETITIVE COAL LEASE TRACTS BY ALTERNATIVES

Bypass Alternative	Minimum Surface Owner Conflicts Alternative	Target Alternative	High Alternative
La Plata #1	La Plata #1	La Plata #1	La Plata #1
Star Lake West #2	La Plata #2	La Plata #2	La Plata #2
Kimbeto #1	Star Lake West #2	Star Lake West #2	Star Lake West #2
Gallo Wash #1	Kimbeto #1	Kimbeto #1	Kimbeto #1
Bisti #6/8	Kimbeto #2	Kimbeto #2	Kimbeto #2
Hospah #1	Nageezi	Nageezi	Nageezi
Gamerco #1 (HC)	Gallo Wash #2	Gallo Wash #1	Gallo Wash #1
Bisti #4	* Lee Ranch East	Gallo Wash #2	Gallo Wash #2
	Lee Ranch Middle	Bisti #6/8	Bisti #6/8
	Lee Ranch West	* Lee Ranch East	* Lee Ranch East
	Divide	Lee Ranch Middle	Lee Ranch Middle
	Hospah #2	Lee Ranch West	Lee Ranch West
		Divide	Divide
		Hospah #1	Hospah #1
		Hospah #2	Hospah #2
		Gamerco #1 (HC)	Gamerco #1 (HC)
		Bisti #4	Bisti #4
		Johnson Trading Post	Johnson Trading Post
		Star Lake East #1	Star Lake East #1
		Bisti #1	Star Lake East #1
		Bisti #2	Bisti #1
		Catalpa Canyon	
		Sundance	
		Samson Lake #2/2	
			Bisti #2
			Catalpa Canyon
			Sundance
			Samson Lake #2/2
			Samson Lake #3
			La Plata #4
			Star Lake East (LC)
			Crownpoint Northeast
			Crownpoint East (HC/LC)
			* Chico Wash South
			* Ta-ha-bah Well
			* Hogback
			Twin Buttes
			* Pinehaven
			* Bread Springs #1
			* Bread Springs #2
			Gamerco #1 (LC)
			* Gamerco #2 (LC)
			Samson Lake #1

* (See Preface.)

TABLE 1-3

COMPETITIVE COAL LEASE TRACTS LOCATED ADJACENT
TO EXISTING AND PROPOSED MINES, LEASES, & PRLAS
(BYPASS ALTERNATIVE)

Tract	Existing Lease/Mine	Proposed Lease/Mine	PRLA
La Plata #1	Black Diamond Mine		
Star Lake West #2		Star Lake Mine	NM 8715
Kimbeto #2			NM 3918 NM 3919
Gallo Wash #1			NM 8128
Bisti #6 a/	NM 186612		
Bisti #8 a/	NM 186612 NM 186615 De-na-zin Mine		
Hospah #1		South Hospah Mine	
Gamerco #1 (HC)	Mentmore Mine		
Bisti #4			NM 3754

Note: a/ Bisti #6 and #8 are one tract. They have been separated to show which leases and mine they are located next to.

2000 (peak production). (Refer to Figure 1-1). Projected average annual coal production would be approximately 2.26 million tons from 1985 through the year 2007 for seven of the eight tracts. The Hospah #1 tract is expected to be combined with the proposed South Hospah Mine rather than being developed separately. The "diligent development" requirements of 43 CFR 3480 would thus be met in the combined or amended mine plan, even though actual operations on the portion analyzed in this EIS may not begin until many years later.

The total amount of surface disturbed on these tracts would be approximately 6,130 acres. Before reclamation, surface mining would disturb approximately 373 acres on four tracts in 1987 and approximately 1,342 acres on four tracts in the year 2000 (refer to Table 1-4). Approximately 600 acres would be disturbed for onsite surface facilities, including coal and topsoil storage areas, haul and access roads, and power and telephone lines. No additional construction workers would be required since these would be extensions of existing operations. Construction workers would be replaced by production and transportation workers.

TABLE 1-4
SURFACE ACRES DISTURBED
BY EACH ALTERNATIVE AND PRIAs

Alternative <u>a/</u>	Mining		Surface Facilities	Average Acres/Year	Acres/ Mine Life
	1987	Year 2000			
No Action	8,000	16,000	1,000	600	25,000
Preference Right Lease Issuance	1,500	10,000	705	550	22,020
Bypass	364	1,342	600	395	6,130
Minimum Surface Owner Conflicts	308	4,988	1,050	510	19,302
Target	859	10,593	2,100	1,177	35,977
High	1,771	23,641	3,500	2,120	68,641

a/ Impacts are attributable solely to a particular alternative or action.

Minimum Surface Owner Conflicts Alternative

This alternative was recommended as the preferred alternative by the Regional Coal Team (RCT) at the April 27th, 1983 RCT meeting. This preferred alternative is that of the RCT, and does not bind the Secretary in any way in reaching a final federal leasing decision.

Under this alternative 11 tracts would be offered for lease sale, six of the tracts listed in Table 1-2 would be surface mined, and five would be underground mined.

It appears that minimal conflicts with surface owners regarding coal mining would occur on these tracts. There is minimal surface owner conflict because, either there is no surface owner consent required, or surface owner consent has been acquired, or the tract is for an underground mine. Federal in-place reserves that would be leased are approximately 916 million tons, of which 349 million tons are recoverable. Projected coal production would be approximately 2.1 million tons in 1987 (start-up) from three tracts and 13.4 million tons for the year 2000 (peak production) from seven tracts (refer to Figure 1-1). Projected average annual coal production would be approximately 7.15 million tons from 1985 through the year 2007 for 9 of the 11 tracts.

Gallo Wash #2 and Hospah #2 are expected to be combined with existing operations, rather than being developed separately. The "diligent development" requirements of 30 CFR 211 would thus be met in the combined or amended mine plan, even though actual operations on the portion analyzed in this EIS may not begin until many years later.

The total amount of land disturbed on these tracts would be approximately 19,302 acres. Acres disturbed per year are listed in Table 1-4. Before reclamation, surface mining would disturb approximately 308 acres on two tracts in 1987 and approximately 4,988 acres on five tracts in the year 2000. Approximately 1,050 acres of these tracts would be disturbed by onsite surface facilities composed of coal and topsoil storage areas, haul and access roads, and power and telephone lines.

Construction would begin between 1984 and 1994, with production starting during the second year of construction. Surface and underground mines would require 4 and 6 years respectively for construction.

An estimated 4,136 construction jobs would be created in bringing the 11 tracts into production. Not all of these jobs would exist in any given year. As the mines came into production in the second year, a number of construction workers would be replaced by production and transportation workers.

Target Alternative

This alternative proposes to offer for lease 24 tracts (refer to Table 1-2). Nineteen tracts would be surface mined and five would be underground mined. Federal in-place reserves that would be leased are approximately 1.32 billion tons, with approximately .7 billion tons being recoverable. Projected coal production would be approximately .005 billion tons in 1987 (start-up) on 12 tracts and .025 billion tons in the year 2000 (peak production) on 16 tracts (refer to Figure 1-1). Projected average annual coal production would be approximately .03 billion tons from 1985 through the year 2007 for 21 of the 24 tracts.

The Hospah #1, Gallo Wash #2, and Hospah #2 tracts are expected to be combined with existing operations rather than being developed separately. The "diligent development" requirements of 30 CFR 211 would thus be met in the combined or amended mine plan, even though actual operations on the portion analyzed in this EIS may not begin until many years later.

The total amount of disturbance on these 24 tracts would be approximately 35,977 acres. Acres disturbed per year are listed in Table 1-4.) Before

reclamation, surface mining would disturb approximately 859 acres on 11 tracts in 1987 and 10,593 acres on 14 tracts in the year 2000. Approximately 2,100 acres of these tracts would be disturbed by onsite surface facilities, including coal and topsoil storage areas, haul and access roads, and power and telephone lines.

Construction would begin between 1984 and 1994. Surface and underground mines would require 4 and 6 years respectively for construction, and production would start during the second year of construction. Full production level would be reached in four to six years.

An estimated 6,958 construction jobs would be created in bringing the 24 tracts into production. Not all of these jobs would exist in any given year. As the mines came into production in the second year, a number of construction workers would be replaced by production and transportation workers.

High Alternative

This alternative proposes to offer for lease all 39 tracts brought forward in the tract selection process. Of this total, 28 tracts would be surface mined and 11 would be underground mined. All 39 competitive coal lease tracts are shown on Visual C (enclosed with the draft EIS) and listed in Table 1-2.

Federal in-place reserves that would be leased total approximately 1.94 billion tons, of which approximately 1.09 billion tons are recoverable. Projected coal production would be approximately .009 billion tons in 1987 (start-up) for 19 tracts and .062 billion tons in the year 2000 (peak production) for 30 tracts (refer to Figure 1-1). Projected average annual coal production would be approximately .024 billion tons from 1985 through the year 2007 for 36 of the 39 tracts. The Hospah #1, Gallo Wash #2, and Hospah #2 tracts are expected to be combined with existing operations, rather than being developed separately.

Construction would begin between 1984 and 1994. Surface and underground mines would require 4 and 6 years respectively for construction. Production would start during the second year of construction.

The total amount of surface disturbed on these tracts would be approximately 68,641 acres. Before reclamation, surface mining would disturb approximately 1,771 acres on 17 tracts in 1987, and 23,641 acres on 22 tracts in the year 2000. Approximately 3,500 acres of these tracts would be disturbed by onsite surface facilities, including coal and topsoil storage areas, haul and access roads, and power and telephone lines. Acres disturbed per year are shown in Table 1-4.

An estimated 10,237 construction jobs would be created in bringing the 39 tracts into production. Not all of these jobs would exist in any given year. As the mines began production in the second year, a number of construction workers would be replaced by production and transportation workers. Four to six years would be required to reach full production capacity.

AUTHORITIES FOR COAL LEASING AND DEVELOPMENT

This section presents an overview of the major laws that authorize the leasing of federal coal resources. The primary emphasis is on statutes that directly control leasing and mining activities. Other authorities dealing with site-specific decisions on coal development are cited in Appendices A-4 and A-5.

Mineral Leasing Act of 1920

This act provided that deposits of coal, phosphate, potassium, oil, oil shale, gas and sodium could be acquired through a leasing system. This law specifies, among other things, minimum royalties, acreage limitations, and the lease term required for each kind of leasable mineral.

Federal Coal Leasing Amendments Act of 1976 (FCLAA)

The broad purpose of the FCLAA is to provide a more orderly procedure for the leasing and development of coal presently owned by the United States. Among the most significant requirements of the FCLAA governing the awarding and development of federal leases are the following:

1. All leasing must be by competitive bidding for fair market value.
2. Issuance of prospecting permits is abolished.
3. Diligent development and continued operation is required (except continuous operation may be waived upon payment of advance royalties) as required by 30 CFR 211.1 (a) (13 & 14).
4. Leases to a single entity are limited to 100,000 acres nationwide (as well as 46,080 acres in a particular state).
5. State shares of royalties were raised from 37 1/2 percent to 50 percent, with the new portion of the monies available not just for construction of roads and schools, but also for a wide range of specific services and facilities in impacted areas.
6. Public bodies were entitled to have reserved a reasonable number of leasing tracts for their own energy production.

Federal Land Policy and Management Act of 1976 (FLPMA)

The purpose of FLPMA is to provide the first comprehensive statutory statement of purposes, goals, and authority for the use and management of federally-owned lands administered by the Secretary of the Interior through the Bureau of Land Management. FLPMA included the following basic item:

1. Statutory framework for land-use planning for public lands.
2. Confirmation that the BLM may continue to rely on existing plans.

3. Liberalized use of mineral revenues by states and local governments. FLPMA provided that the entire 50 percent of the funds received by the federal government for the development of leasable minerals on federal land could be used for any public purpose. FLPMA also established a program to provide low-interest loans to states and local governments impacted by federal land mineral development activities.
4. Requires review of all BLM roadless areas of 5,000 acres or more (and roadless islands) for potential designation as wilderness.
5. Authority to exchange lands or interests in lands.

Surface Mining Control and Reclamation Act of 1977 (SMCRA)

This act was passed in response to concern over the potential extensive environmental damage that may be caused by coal mining, and because of the technological and economic changes that now favor surface over underground mining. SMCRA established uniform minimum federal standards for regulating surface effects of coal mining and reclamation activities throughout the country and for ensuring adequate protection from the environmental impacts of surface mining operations in all states.

Other features of SMCRA relevant to the leasing and development of coal are:

1. Authority to exchange federal lands already under lease in an alluvial valley floor and are subject to the grandfather clause in Section 510(b)(5) of the act.
2. A requirement for the consent of certain qualified private surface owners before leasing of any federal coal underlying privately-owned surface.
3. Provisions for designating lands unsuitable for coal mining.

GENERAL STIPULATIONS

The development of federal coal resources must be carried out in compliance with existing federal and state laws and regulations. The Surface Mining Control and Reclamation Act of 1977 (SMCRA) provides for state regulation of surface mining and reclamation on state and private lands, as well as federal lands under the terms of a cooperative agreement between the Department of the Interior and the State of New Mexico. New Mexico has the primary responsibility for assuring that standards are maintained for regulating surface mining and reclamation. The regulations that have been developed address the environmental protection standards for coal mining. Some of the standards which have been covered include restoration of the land to a condition capable of supporting the uses that it was capable of supporting prior to mining, use of explosives in accordance with state and federal laws, establishment of permanent vegetative cover on areas affected by mining, segregation and replacement of the individual horizons of topsoil, and the assumption of responsibility for successful vegetation on the mined area for a given period of time.

Each lease operator is required to submit for approval a mining and reclamation plan that complies with the rules and regulations of the State of New Mexico, the Office of Surface Mining (OSM), or the Bureau of Land Management prior to commencing mining. The Bureau of Land Management has the responsibility to assure that both efficient mining practices are utilized and environmentally sound mining practices are applied to the development of the federal coal to protect the new coal resources. OSM has the responsibility on federal lands to approve mining and reclamation permit applications, assure permit compliance, and designate lands as unsuitable for mining in response to petitions. The states have the primary responsibility to assure that the standards for surface mining and reclamation on all lands are maintained. These regulations deal with water conditions, land use, cultural resources, reclamation, wildlife, and mine safety practices.

COMMITTED MITIGATION MEASURES

The development of federal coal resources must be carried out in compliance with existing federal and state laws and regulations. All mining would be done in accordance with all statutory and regulatory minimums, including the requirements in the standard coal lease form (Appendix I-1).

Special stipulations have been developed for the PRLAs (Appendix I-2). Stipulations required for each PRLA are available for public review in the Albuquerque District and Farmington Resources Area offices. These or similar stipulations will be adopted by BLM (and BIA where appropriate) for the competitive lease tracts. Monitoring will be by the OSM, BLM, BIA or the state as appropriate. Uncorrected or persistent violations of lease terms may result in an action to cancel the lease. A detailed monitoring plan will be determined during mine plan development. The following major requirements under these standard measures and committed special stipulations include the following protective measures.

Reclamation

Before mining will be allowed, each lessee will have to show that reclamation of the lands to its pre-mining productivity is economically and technically feasible. This requires the lessee to show how he intends to carry out revegetation and to submit studies and information showing that revegetation to a pre-mining level can be successful on the particular lease. Extensive bonding is required from the lessee and is not released until reclamation success is proven. The lessee does not have to show absolute certainty of success, but must show that success is likely.

Cultural Resources

The standard lease form requires intensive cultural resource inventory as part of mine plan development (Section 31 (a)). Before the lessee conducts any surface disturbance activities on the lease, he must at his expense do a complete intensive cultural resources survey (Class III 100 percent on-the-ground survey) on federal lands or lands overlying federal coal of the entire area to be disturbed using the services of a qualified professional cultural resource specialist.

Following intensive cultural resource inventory, sites will be evaluated, and determinations of National Register eligibility will be made by the office of Surface Mining in consultation with and concurrence of the BLM or BIA and the State Historic Preservation Officer. The Office of Surface Mining, under consultation and concurrence with the State Historic Preservation Officer, Bureau of Land Management, and Bureau of Indian Affairs (if BIA-administered lands are involved) will identify effects and appropriate measures to be taken for mitigation of effects on sites which have been determined eligible for the National Register.

Section 31(a) of the standard lease form is interpreted to provide for in-place preservation of sites (including buried sites found during mining) which may be determined eligible for the National Register when such in-place preservation is determined by the regulatory authorities, in consultation with the SHPO, to constitute appropriate mitigation of adverse effect.

Surface coal mining operations on the identified sites which do not require in-place preservation will be allowed after the lessee carries out measures to avoid adverse effects to the sites in accordance with the plan approved by the Office of Surface Mining with concurrence from the Bureau of Land Management, Bureau of Indian Affairs and the State Historic Preservation Officer.

If any cultural resources are discovered during the mining, the lessee is required to halt operations until the resource has been examined.

Lessees of the following tracts, Kimbeto #1, Kimbeto #2, Gallo Wash #1, Gallo Wash #2, Hospah #1, Hospah #2, Bisti #4, Crownpoint Northeast, Crownpoint East (HC/LC) shall take the following actions to protect the stability of standing walls of ruins within the Chaco Culture National Historical Park and the detached portions of the park:

1. A monitoring program approved by the New Mexico Mining and Minerals Division with concurrence from BLM under consultation with the National Park Service will be established to monitor the effects of blasting or other related mining activities on the stability of the ruins.
2. Coordination with the National Park Service will be undertaken concerning any changes that would affect site condition. This may include restriction for any damage that can be demonstrated.

Standing walls at Site LA 44728 will be stabilized to standards specified by the Bureau of Indian Affairs, at the expense of the lessee of the Crownpoint Northeast Tract and prior to any activity which might damage the structure.

During mining this site will be included in a monitoring program to monitor the effects of blasting and other mining related activity, and coordination with the Bureau of Indian Affairs will be undertaken concerning any changes that would affect site condition. This may include restriction for any damage that can be demonstrated.

LA 44728 is a small, but very well preserved Chacoan structure which is believed to have been built as a shrine. It is an outstanding example of a

specialized form of twelfth century Anasazi architecture and warrants preservation for future generations.

Ethnographic studies shall be completed at mine plan to ensure that properties of possible associated cultural values to regional cultural groups are identified. Such properties should include those sites protected under the American Indian Religious Freedom Act, human burial sites, and any sites of particular historic value to the development of the cultural groups concerned. Following identification of such properties, appropriate mitigation measures approved by the Bureau of Land Management and/or the Bureau of Indian Affairs and under consultation with the State Historic Preservation Officer shall be established and implemented.

Paleontological Resources

Before the lessee conducts any surface disturbance activities on the lease, he must assure that a complete paleontological survey and inventory has been accomplished on federal lands or lands overlying federal coal of the entire area to be disturbed using the services of a qualified paleontological resource specialist, approved by the designated BLM official. Upon completion of this procedure, the paleontological sites will be evaluated and determinations made of their potential significance and disposition as specified in the base stipulations attached at the mine plan stage. All costs associated with loss of production, equipment down-time, and excavation will be born by the lessee.

Gravesites

Each lessee is required to survey the lease and interview local residents for information on gravesites and to avoid mining within 100 feet of a gravesite unless the gravesite is lawfully relocated. This is in addition to the SMCRA requirements on cemeteries.

Residences

Each occupied dwelling will be protected from mining by a 300-foot buffer zone unless the owner of the dwelling gives permission to mine closer.

Water Resources

The lessee shall protect the physical and legal availability of existing water sources in the lease application area. Any water removed or contaminated due to coal mining operations shall be replaced by the lessee. Although replacement water need not be identical to the original water source, it shall be of equal quality and quantity or better. This is in accordance with New Mexico water law and the State Engineers office who make all water allocation determinations.

Sacred Sites

Each proposed lease contains a notification procedure to allow an opportunity for mitigation of adverse affects on sacred sites. For this purpose, the lease will include a requirement that the lessee give notice of pending mining to the Navajo Tribe, the Tribal Chapter in which the mining is located, and the Navajo Medicineman's Association.

Wildlife

The lessee is required to include wildlife mitigation in the mine plan, avoid or otherwise protect raptor nests, and conduct surveys to locate Federal and State threatened and endangered species.

The lessee shall conduct a detailed survey for migratory bird species of High Federal Interest on areas that will be disturbed by surface coal mining. The BLM shall approve the survey. The survey shall be completed before the lessee applies for a permit under the Surface Mining Control and Reclamation Act. The nest and a buffer zone will be preserved from surface disturbance unless the surface management agency and the Fish and Wildlife concur that surface coal mining will not adversely affect the migratory bird habitat during the periods when such habitat is used by the species. The lease application area has not been completely surveyed for migratory birds of High Federal Interest. Surveys at mine plan stage would be necessary to locate new nests.

T & E

Surveys for federal or state threatened or endangered species will be conducted prior to surface disturbance. These surveys will be required as committed stipulations for PRLAs as well as new leases. If endangered species are located, OSM or the surface managing agency (BLM or BIA) will re-initiate formal consultation with the FWS as required by the Endangered Species Act of 1973. Appendix D provides background information for compliance with the Endangered Species Act of 1973. If formal Section 7 consultation is initiated, the Federal agency and the permit or license applicant shall not make any irreversible or irretrievable commitment of resources with respect to the agency action which has the effort of foreclosing the formulation or implementation of any reasonable and prudent alternative measures which would avoid jeopardizing the continued existence of any endangered or threatened species or adversely modifying or destroying the critical habitat of such species. Section 7 consultation may advise surface management or permitting agencies to alter lease boundaries, preclude surface mining, or change mining practices.

One Hundred percent surveys for Mesa Verde cactus and black-footed ferrets will be done at the mine plan stage. Also, if surface disturbance is delayed for two years or more beyond the mine plan stage, then a one hundred percent survey for ferrets will be done one year prior to surface disturbance.

Vegetation

Surveys will be conducted to locate federal and state threatened and endangered plant species.

Wilderness Study Areas

Each lease will bar the lessee from surface coal mining operations in a Wilderness Study Area until the Congress decides upon the status of the land and requires all operations to be consistent with any Congressional decision on the lands.

Surface Owners

Each qualified surface owner with a patent containing a reservation of coal for the United States is generally entitled to protection before coal is surface mined. The protection consists of imposing on the lessee the obligation to receive the qualified surface owner's consent and to post a bond to compensate the owner for damages to crops, improvements, and forage.

UNSUITABILITY CRITERIA

It is the Department of the Interior's responsibility to carry out the review of federal lands as to their suitability for surface coal mining. This review is conducted under Section 522(b) of the Surface Mining Control and Reclamation Act of 1977, principally through land use planning assessments.

Unsuitability criteria (refer to Appendix A-10) [found in Title 43 CFR 3461.1 (a)(1) through (t)(1)] have been applied to the PRLAs and competitive coal lease tracts addressed in this EIS. The results of this application are found in Table 1-5, with a general explanation which follows. Also as a result of this application, stipulations for the PRLAs have been developed; they appear in Appendices I-1 and I-2. Stipulations that are attached to each individual PRLA along with maps showing the application of unsuitability criteria can be reviewed at the BLM New Mexico State Office, Albuquerque District Office or Farmington Resource Office. These or similar stipulations such as those on pages 1-16 through 1-20 will be attached to any leases issued for the competitive coal lease tracts.

Application of Criteria

Criteria #5 (VRM Class I), #6 (Permitted Lands for Scientific Studies), #8 (National Natural Landmark or Natural Areas), #17 (Municipal Watersheds) #18 (National Resource Waters) #19 (Alluvial Valley Floors), and #20 (Federal Lands Unsuitable by State Rulemaking) were found to have no effect on the suitability of the PRLA's or competitive coal lease tracts to be mined.

After consultation with the U.S. Fish and Wildlife Service (FWS) and the State of New Mexico, wildlife criteria #9 (Threatened or Endangered Species), #10 (State Threatened or Endangered Species), #12 (Bald and Golden Eagle Migration or Wintering), and #15 (State Species of High Interest) were found to have no effect on the suitability of the PRLA's or competitive coal lease tracts to be mined.

The following criteria have been applied and affect PRLAs and the competitive coal lease tracts. The following is a discussion of these criteria:

Criterion 1 - National Park System, National Wildlife Refuge System, National System of Trails, etc.

TABLE 1-5

PUBLIC LANDS UNSUITABLE FOR SURFACE COAL MINING

Criterion	PRLA	Competitive Coal Tracts
#2 (Rights-of-way easements or surface leases)	No Effect	A total of 160 acres (an existing emergency coal lease to Carbon Coal Company) in the Gameraco #1 (Bypass) Tract is unsuitable.
#3 (Residential, Community)	No Effect	A total of 480 acres (160 acres located within the City of Gallup in the Hogback Tract and 320 acres of the Pinehaven Subdivision in the Pinehaven Tract) are unsuitable.
#4 (Wilderness Study Areas)	A total of 320 acres of NM-11916 fall within the Bisti WSA, and 5,355 acres of NM-6804, NM-3919, NM-3918 fall within the Ah-shi-sle-pah WSA. ^{a/} A total of 7,749 acres of NM-6801, NM-3834, and NM-3838 overlap the De-na-zin WSAs where underground mining is allowed with no surface facilities or subsidence.	No Effect
#7 (Cultural Resources)	No Effect	A total of 520 acres (440 acres for Basketmaker III, Pueblo I, and Chacoan sites in the Crownpoint NE Tract and 80 acres pending further studies for an historic battleground in the Bisti #1 Tract) are unsuitable.
#11 (Golden Eagle)	No Effect	A total of 355 acres for two nests and their buffer zones fall within the Johnson Trading Post and Nageezi Tract.
#13 (Prairie Falcon)	A total of 160 acres for one nest existing within NM-3834 (refer to Appendix A-7).	No Effect
#14 (Ferruginous Hawk)	A total of 1,945 acres for five nesting sites exist within NM-3835, NM-3919, NM-3834, NM-11916 (refer to Appendix A-7).	A total of 115 acres of one nesting site occur within Bisti #4. (refer to Appendix A-8).

Note: ^{a/} The BLM has requested preliminary final showing information from the holders of all PRLAs, including those that overlap the Ah-shi-sle-pah WSA. However, no leases will be issued until after a final decision is reached on the status of this WSA.

Portions of the Continental Divide National Scenic Trail study corridor is routed through or adjacent to the Star Lake West #2, Gallo Wash #1, Hospah #1, Star Lake #1 or Johnson Trading Post tracts. The actual treadway for the Continental Divide National Scenic Trail has not been established. In view of this situation, this criterion does not require the proposed study corridor to be designated as unsuitable for surface coal mining.

Criterion 2 - Federal lands within rights-of-way or easements or within surface leases for residential, commercial, industrial or other public purposes.

Existing leases (rights-of-way, easements, etc.) are unsuitable for competitive coal leasing. Application of this criterion affects acreage in the Gamarco #1 (Bypass) tract (refer to Table 1-5).

Criterion 3 - Federal lands affected by Section 522 (e) (4) and (5) of the Surface Mining Control and Reclamation Act of 1977.

Lands within 100 feet of a cemetery or public road, or within 300 feet of a community, or occupied dwelling are unsuitable for surface coal mining. This criterion affects acreage in the Hogback and Pinehaven tracts (refer to Table 1-5).

Criterion 16 - Federal lands in riverine, coastal and special flood-plains (100-year recurrence interval).

The exceptions and/or exemptions of these criteria have been applied to the PRLAs and competitive coal lease tracts, except where noted. Special stipulations will be included in each lease permit to protect valid existing rights. For Criteria 16, special stipulations will be included to ensure that coal mining can be undertaken without substantial threat of loss to people or property. These stipulations will be applicable to all proposed competitive lease tracts.

Criterion 4 - Federal lands designated as Wilderness Study Areas (WSAs).

Wilderness Study Areas are unsuitable for surface coal mining and no surface facilities or subsidence are allowed for underground mining. This criterion does not affect any of the competitive coal tracts, but it does affect seven PRLAs (refer to Table 1-5).

Criterion 7 - Federal lands included in or eligible for inclusion in the National Register of Historic Places.

Correspondence with the New Mexico State Historic Preservation Officer has fully documented National Register eligibility, application of Unsuitability Criterion 7 and exceptions for 304 sites in the competitive coal leasing tracts (refer to Table 1-5). The exception to criterion 7 could not be made for one

property, the location of an historic battle (ground) between the Ute and Navajo Indians. This site would be suitable for surface coal mining pending further study.

Supplemental inventories, following completion of the draft EIS, located an additional 264 sites (293 components) in the competitive coal leasing tracts (See Appendix A-11). These sites plus 51 previously recorded sites on Indian trust surface, were the subject of meetings among the BLM, BIA, and New Mexico State Historic Preservation Officer in July 1983. Agreement was reached among all parties concerning National Register eligibility and application of Unsuitability Criterion 7 and exceptions. It was determined that 440 acres in the Crownpoint NE tract would be considered unsuitable for coal mining based on Criterion 7 (refer to Table 1-5).

As provided by the exception to this criterion [after consultation with the State Historic Preservation Officer (SHPO)], surface coal mining operations on tracts with identified sites will be allowed. However, this mining will be allowed only after the lessee carries out measures to avoid adverse impacts to the significant sites, in accordance with a mitigation plan approved by the BLM.

Further, all of the subject lands will be required to be inventoried for cultural resources. Consultation between the BLM and the BIA, OSM, and SHPO, will occur to determine if located sites are eligible for inclusion on the National Register of Historic Places. If adequate mitigating measures cannot be devised for these sites, the sites (and appropriate buffer zone) would not be surface mined.

Criterion 11 - Active bald or golden eagle nest or site on Federal land.

Criterion 13 - Federal lands which contain falcon nests.

Criterion 14 - Federal lands which are high priority habitat for migratory bird species of high Federal interest.

After consultation with the FWS, Criterion 11 has been found to affect two competitive coal tracts, Criterion 13 affects one PRLA and Criterion 14 affects four PRLAs and two competitive coal tracts (refer to Table 1-5).

SURFACE MINE RECLAMATION

Each surface tract would be developed under a mine plan. Because these mines would disturb and reclaim areas in stages, only part of the potential mining area would be disturbed annually. Table 1-6 lists the acreage disturbed (by tract) and maximum area of land unreclaimed during the

TABLE 1-6

ACREAGE DISTURBANCE BY SURFACE MINES AND FACILITIES
DURING VARIOUS STAGES OF THE MINING SEQUENCE

Tracts	Annual Disturbance from Mining	Unreclaimed Mined Lands By Year ^a	Disturbance from Facilities ^{b/} , ^{c/}	Maximum Unreclaimed Lands ^{d/}
Underground (Average)	0	80	80	80
Surface Mine (Average)	78	234	100	334
La Plata #1	40	120	50	170
Star Lake West #2	65	195	100	295
Kimbeto #2	35	105	50	155
Gallo Wash #1	67	201	100	301
Bisti #6/8	40	120	50	170
Lee Ranch East *	24	72	50	122
Lee Ranch Middle	148	444	200	644
Lee Ranch West	188	564	200	764
Divide	75	225	100	325
Hospah #1	80	240	100	340
Gamerco #1 (HC)	7	24	50	75
Bisti #4	60	180	100	280
Johnson Trading Post	86	258	100	358
Star Lake East #1	70	210	100	310
Bisti #1	89	267	100	367
Bisti #2	32	96	100	346
Catalpa Canyon	40	120	50	170
Sundance	23	69	50	119
Samson Lake #2/2	8	21	50	71
La Plata #3	16	48	50	98
Crowpoint Northeast	206	618	200	818
Crowpoint East (H/LC)	261	783	200	983
Chico Wash South *	148	444	200	644
Hogback *	43	129	50	179
Twin Buttes	250	750	200	950
Pinehaven *	29	87	50	137
Bread Springs #1 *	6	18	50	68
Gamerco #1 (LC)	4	12	50	62

- Notes: ^{a/} Assumes 3-year period from initial disturbance by mining operations to establishment of vegetation cover.
^{b/} Continues through life of mine; shows average acre need for onsite and offsite facilities.
^{c/} These figures are predicted upon information on surface disturbance acreage from surface mines in the Uinta-Southwestern Utah and Bisti-Star Lake EIS, and from the Lee Ranch, Montmore, and Star Lake Mine plans. Estimated acreage for on site and offsite facilities are as follows:
^{d/} Maximum area that would be unreclaimed at any one time.

Annual Mine Surface Disturbance	Acres Needed for Facilities
0-50 Acres	50
50-100 Acres	100
>100 Acres	200

*(See Preface.)

reclamation sequence. It is assumed that areas disturbed for underground mines and facilities would remain unreclaimed for the life of the mine, although reclamation would be required after facilities were removed.

Vegetation would be established within 3 years on the acreage initially disturbed by mining. This does not imply that a total return to original vegetation would occur in that time period, but vegetation cover sufficient to retard wind and water erosion of soil would be established (J.A. Ferraiuolo and J.C. Bokich, 1982). Depending upon the original vegetation type on each tract, restoration to original conditions could require a much longer period of time (5 to 30 years or more).

A detailed surface mining and reclamation plan based on permanent program performance standards for surface mining (30 CFR 816) must be submitted to and approved by the State of New Mexico's Mining and Minerals Division, New Mexico Energy and Minerals Department in cooperation with the federal Office of Surface Mining (OSM). A site-specific environmental analysis of the mine plan will be prepared by the OSM. The State of New Mexico will then issue a permit to mine, but only if the lessee can show that revegetation is economically and technologically feasible on the particular land proposed to be mined. They will oversee the reclamation work with the cooperation of BLM.

The BLM also develops special reclamation requirements included in federal coal leases and in mining and reclamation plans. These special requirements are related to the management and protection of all resources other than coal, and to the post-mining land uses of the affected public lands.

Revegetation

The proposed action requires each lessee to return lands disturbed by surface mining to a condition capable of supporting pre-mining uses and to establish on the disturbed lands a diverse, effective and permanent vegetative cover capable of plant succession and of at least equal extent to the pre-mining cover. Introduced species may be used in some cases. This section discusses the general or qualitative effects related to revegetation. The discussion for the alternatives presents a quantitative view.

The process of achieving the required revegetation includes three major series of tasks. The first series of tasks requires the lessee to identify soil characteristics and to determine which soil horizons or other material are suitable for use as a growth medium, to protect and segregate those materials during mining, and to replace them over the disturbed area in a depth sufficient to support plant growth.

The second group of tasks requires identification of pre-mining vegetation communities, soil profiles, and microclimates to determine what revegetation techniques must be used. The techniques best suited to each area can then be determined through the use of test plots which allow experimentation on soil recomposition, seed ratios, irrigation techniques, and mulching before mining takes place. The plots help both to determine whether revegetation is technologically feasible for the area and to provide guidance on optimum revegetation techniques.

The third series of tasks is the actual planting of seeds and promoting of growth of the plant community on the lands to be revegetated. A lessee is required to make an initial planting and to make supplemental planting as needed to meet his revegetation obligations. The lessee remains fully responsible for revegetation success for 10-15 years after it last adds seed, fertilizer, or irrigates the land. Reclamation costs are considered in setting the bond a lessee must post prior to mining.

Over the past 20 years, the coal industry has gained considerable experience with revegetation in the San Juan Basin and other comparable lands in the western United States. Initially, experts regarded revegetation success here as difficult to achieve, and, in fact, initial efforts in the San Juan Basin were not highly successful. Since those early efforts, the coal industry, research by state and federal agencies, and agricultural universities have developed a regime, that with site-specific modification, has shown good revegetation results. The steps generally being followed are: identification and placement of suitable growth medium, planting of native vegetation in proper seed ratios, and use of mulch and supplemental irrigation where water of adequate quality is available.

Based upon the limited, but encouraging results exhibited by current reclamation procedures in the San Juan Basin, the Bureau at this time does not feel a need to designate any of the subject lands unsuitable for coal mining because of reclamation concerns. All of the PRLAs and competitive coal tracts will receive a site specific determination on the mine plan regarding their reclamation potential before mining occurs.

MAJOR ISSUES

As a result of public comment during the scoping and consultation process for this EIS, a number of specific issues have surfaced. The following sections give a brief overview of the major issues of public concern; these issues are discussed in greater detail in Chapters 2 and 3.

Air Quality

The major issues concerning air quality are the potential increase in total suspended particulates (TSP) over federal and state ambient air quality standards, and the general degradation of air quality over the Chaco Culture National Historical Park.

Water Resources

Questions and concerns about water quantity and quality were major points of discussion. Numerous participants stated that the San Juan River was currently over-allocated, and any additional water use could have severe impacts to downstream users. The alternative of using ground water or water from uranium mines was also a controversial topic. Potential adverse impacts from ground water drawdown were described, as well as a fear that water from uranium mines would not be adequately treated and radionuclides could be introduced to plants and their environment. Numerous questions were also raised about possible impacts to water quality caused by acid deposition from the proposed plants, coal mine runoff, and other activities in the area.

Soils and Reclamation

Reclamation concerns centered around whether or not the subject lands could be reclaimed, and if so, whether or not the time frames and costs involved in reclamation are reasonable. Many individuals felt that the mined lands could never be reclaimed to their former production capabilities. Livestock productivity is a spin-off of this central issue, as are water quality and erosion in the Region. Some impacts on these resources will depend upon the success of revegetating the reclaimed land.

Paleontology

Members of the scientific community and the general public expressed concern about the loss of significant fossils and information from the mined areas. Other individuals of the community felt that mining would allow for the extraction of scientific data that would not be available if mining did not occur. It is felt that the loss of potentially significant information would be far greater than the information gained from coal mining.

Cultural Resources

Numerous comments were received expressing concern over the destruction of uninventoried archaeological sites, vandalism, and the collection of artifacts because of the ease of access to the sites in the region. Concerns also centered around the possible destruction of structures within Chaco Cultural National Historic Park, some Chacoan Outliers, and uninventoried structures due to blasting.

Recreation, Wilderness, and Visual Resource Management

It was felt that mining and associated activities would be detrimental to the visual quality of the region. Further, these activities would distract from the the quality of experience in the Wilderness Study Areas (WSAs), and limit the recreation opportunities in the badlands close to, and overlying the coal tracts. Noise would be especially distracting to visitors participating in these activities.

Wildlife

Major issues surfaced concerning the destruction of habitat and nesting sites for golden eagles, ferruginous hawks, and prairie falcons (species of high federal interest) by mining and related activities. Concern was also expressed regarding destruction of deer and elk winter range, increased road kills, and illegal shooting of these animals. Of additional concern was reclamation of wildlife habitat values, secondary impacts to fish and wildlife resulting from increased population, consequent social and economic developments, and mining impacts to intermittent and perennial aquatic habitats.

Transportation and Rights-of-Way

The issues concerning transportation center on the increased demand on the existing network of roads caused by mine and facility development. The corresponding increase in road maintenance costs, design problems, and potential for conflicting use are also topics raised. Other issues include how the

location of transmission lines, pipelines, and other utility corridors would affect existing land practices and the region's visual quality (landscape character).

Social and Economic Factors

Public Revenues and Costs

The main issue raised here is whether or not local governments can handle the rapid population growth associated with facility construction and mining, and the pressures that this type of rapid growth will put on public services. In general, public revenues lag behind public costs by 2 to 3 years during periods of rapid economic development. Costs generated by population growth often exceed the revenues in the first few years of development, creating funding issues that can be difficult to resolve.

Inflation

Short-term inflationary pressure from economic developments is a major issue that is most likely to occur in smaller, less developed trade areas. In these locations the increases in demand for housing, food, clothing, and other needs, strain the local supply or distribution systems. However, long-term inflationary impacts would also be an issue because an operations work force would be located in an area for the 30- to 40-year life of the mine, and individuals not sharing in the economic benefits of development would be at a relative disadvantage in competing for goods and services.

Lifestyle Changes

The basic issue concerning the lifestyle of small communities is the long-term social changes that will occur in conjunction with coal development. The change in the power and economic base of affected communities, with ranching losing some of its dominance to industry, is also an issue. However, this may be offset by the increase in local employment opportunities and the reversal of the trend of outward migration from many small communities. Another issue is the perceived impact to public health and safety from air and water pollution associated with coal development facilities.

American Indian Concerns

Many of these issues centered around impacts to American Indian lifestyle and were similar to the issues discussed above. Other concerns surfaced regarding the hindrance of religious practices through the destruction of sacred sites, gathering areas, and graves. One of the major issues in this EIS is the relocation of occupants; how, when, where, and what are the social implications of the relocation of a people with a traditional lifestyle. The loss of grazing privileges over an extended period of time is also a major concern because grazing of small herds and flocks is a part of the lifestyle of the Navajo people.

INTERRELATIONSHIPS WITH OTHER PROJECTS IN THE REGION

In addition to the proposals analyzed in this EIS, several other actions are pending before the BLM that could be approved. (See the Cumulative Overview for discussion of the New Mexico Generating Station and Proposed Wilderness Areas EIS).

Navajo Land Selection (Navajo-Hopi Relocation)

The first of these actions is a selection that the Navajo Tribe has made of 35,000 acres of public lands (refer to Appendix A-9 for a list of these lands). The selection seeks both the surface and mineral estates under Section 11 of the Navajo Hopi Relocation Amendments Act of 1980 (P.L. 96-305), which allows the Navajo Tribe to select up to 250,000 acres of public land within 18 miles of the current reservation boundary. It is not clear whether or not mineral estates will be transferred with the selection. Up to 35,000 acres of this land can be in New Mexico. The purpose of the selection is to provide a residence area for Navajos relocated from lands in Arizona as part of this settlement of a land dispute between the Hopi and Navajo Indian Tribes. The selection itself is exempt from the environmental requirements of the National Environmental Policy Act of 1969. This selection is currently under active consideration between the Navajo Tribe, Arch Minerals, PNM, and the Department of the Interior.

The interest conveyed by the PRLA's may not be transferred as part of the selection. If so any leases issued would be administered by the BLM and all revenues would be distributed under the Mineral Leasing Act.

Should the selection be approved, the Navajo Tribe could allow development to proceed as proposed by PRLA holders, or the Navajo Tribe could begin an active relocation program that could delay or interfere with proposed surface coal mining operations, greatly reducing mining and its related impacts. Competitive coal lease tracts would not be affected by this action.

Santa Fe Exchange

The second pending action is Santa Fe Pacific Railroad Company's proposal to exchange the fee coal interests it owns for coal owned by the United States. Both the United States' and Santa Fe's coal interests are within the lands currently delineated as the Lee Ranch West, Middle, and East tracts and the Divide tract located in the southern part of the EIS Region with the exception of 7 sections of Santa Fe's lands that lie outside the competitive tracts. The coal in these tracts is owned largely in a checkerboard pattern with the United States owning the odd numbered sections and Santa Fe owning the even numbered sections.

Santa Fe's proposal is to consolidate its coal ownership in the Lee Ranch Middle tract, while the United States would consolidate its ownership in the Lee Ranch East, West, and Divide tracts. The purpose would be for a desirable and more competitive tract to be leased. (Maps of this proposal are on file in the Albuquerque District and Farmington Resource Area Office). The

exchange would be and equal value exchange as allowed by Section 206 of the Federal Land Policy and Management Act of 1976.

Because this proposal was made so late in the writing of this EIS, a full review of its effects has not been completed but an EA will be made available shortly after the final EIS is filed. Preliminary analysis does not show any significant environmental differences between leasing as proposed and leasing under the exchange because the same lands would be available for development under generally the same environmental protection provisions. If the BLM decides to proceed with the exchange, the BLM may also decide to offer for lease the consolidated federal tracts.

Ute Mountain Exchange

Another proposal involves a total of 1,690 acres of surface estate on two PRLAs (NM-3752 and NM-3754) and two competitive lease tracts (Nageezi and Bisti 6/8). These acres are included in the Ute Mountain Exchange Withdrawal (Federal Register Vol. 47, No. 43 Thursday, March 4, 1982). The Ute Mountain Withdrawal reserves the public lands for use in a proposed surface estate exchange between the Public Service Company of New Mexico (PNM) and the BLM. The withdrawal segregates the public lands from the operations of public land laws and the general mining laws. A period of 2 years from the publication of the withdrawal in the Federal Register is allowed for consummation of the surface exchange. Impact analysis for this proposed exchange can be found in the Final Ute Mountain Land Exchange Environmental Assessment (USDI, BLM 1981) and in the NMGS EIS. Consummation of this action will not preclude development of PRLA's or the proposed competitive coal lease tracts.

Navajo Exchange Withdrawal

A total of 400 acres of the competitive lease tracts are within the Navajo Exchange Withdrawal. The Navajo Exchange lands were withdrawn on September 2, 1980 by Public Land Order (P.L.O.) 5721, published in the Federal Register (Vol. 45, No. 87, pages 29295-29297). P.L.O. 5721 withdrew 67,000 acres of public land, reserving them for use in a proposed surface estate exchange between the BLM and the Navajo Tribe. These lands were withdrawn from settlement, sale, location, or entry under the general land laws and the mining laws until consummation of the exchange. Legislation has been passed (October, 1982) to transfer the public land to the Navajo Tribe. Impact analysis for this proposed exchange can be found in the Final Environmental Assessment Record on Proposed Navajo Land Exchange (USDI, 1978). Consummation of this action will not preclude development of PRLAs or the proposed competitive coal lease tracts.

Bisti Coal Lease Exchange

The entire Bisti #1 Tract (approximately 3,713 acres) is under the Bisti Coal Lease Exchange. Public law 96-475 (94 Stat. 2269), dated October 19, 1980, authorized the Secretary of the Interior to issue coal leases within the Bisti #1 Tract upon relinquishment of the leases or portions of leases located within the Bisti Wilderness Study Area. Following the enactment of this act, 30 months are allowed for completion of the lease exchange. As yet no decision has been made. Impact analysis for this proposed exchange can be found in the Draft Bisti Coal Lease Exchange Environmental Assessment (USDI, BLM 1981).

Navajo Litigation

The Navajo Tribe recently filed two lawsuits 1) The District Court for New Mexico, Navajo Tribe of Indians v. State of New Mexico, Civ. No. 83-1148-JB and 2) Etsitty, et. al. v. United States, et. al., D.N.M., Civ. No. 83-1408C, in which the Tribe claims both the title to 2.1 million acres of land and a portion of the Federal coal proposed for leasing in northwest New Mexico. These suits claim virtually all the lands and minerals which the Bureau is proposing to lease. If the suits are successful, the lands and interest covered by these suits would be made a part of the Reservation. Title to the lands and minerals would be held in trust by the United States on behalf of the Navajo Tribe. In that case, the current proposals (Preference Right Lease Issuance and competitive coal tracts) would have to be dropped entirely.

The United States, the State of New Mexico, and others have filed motions to dismiss the first lawsuit on a number of grounds. The existence of the litigation and its possible effect on the proposed actions will be considered in the decision making process for these proposals.

COMPARISON OF THE IMPACTS OF THE ALTERNATIVES AND PRLA'S

Table 1-7 summarizes the impacts from mining the 26 PRLAs and PRLA alternative and the other projects that are part of the No Action Alternative (existing and proposed leases and mines under contract commitments or mine plans, and major federally approved projects).

This section discusses those resource values that would be significantly impacted by coal mining under each of the competitive lease alternatives. Table 1-8 gives the magnitude of these impacts by alternative. The alternatives would produce impacts generally commensurate with the amount of coal produced. The alternatives differ very little from one another by the nature of their impacts. They differ mostly in the magnitude of the impacts they would produce. The cumulative impacts of new federal coal leasing would be the impacts of a particular alternative added to the impacts of the No Action Alternative which includes Preference Right Lease Issuance. Impacts that are shown in the table are attributable solely for a particular alternative.

Air Quality

Air quality impacts would occur under the No Action Alternative and Preference Right Lease Issuance but air quality standards would not be exceeded. However, by adding the additional tracts of the Bypass Alternative, worst-case analysis shows cumulative impacts would cause New Mexico's 24-hour ambient air standards to be slightly exceeded. With the addition of the tracts under the Minimum Surface Owner Conflicts (MSOC) Alternative, this standard could be significantly exceeded (by 84 ug/m³). Additional mining on the tracts of the Target and High Alternatives would show very little increase over the MSOC Alternative. However, air quality standards generally would not be allowed to be exceeded. If conditions exist that the standards would be exceeded then the mines would be required to shut down or cut back production to be in compliance with the air quality standards.

Topography, Geology, Mineral Resources

Each alternative shows a marked increase in the total number of acres of land disturbed and coal removed, as a result of mining. The numbers nearly triple from the Bypass to MSOC Alternative, and double from the MSOC to the Target and from the Target to the High Alternative.

Paleontology

The development of coal could result in the destruction of important fossil localities. However, some members of the academic community feel that mining would allow for the extraction of scientific data that would not be available if the tracts are not mined. Population increases and access to EIS Region would result in unauthorized collection and vandalism. The Bypass Alternative would disturb an estimated 271 important fossil localities. While the number of localities disturbed would be nearly five times as many under the Target Alternative, the MSOC Alternative would affect only 136 fossil localities.

Soils

Surface disturbance would temporarily disturb significant numbers of acres under each alternative. The acreage removed from production by facilities construction would result in long-term productivity loss. On the acreage being disturbed by surface mining, short-term acceleration of erosion and increase sediment yield would result. Soil mixing, contamination, and compaction would occur during mining operations.

Water Resources

With each alternative the mining process would utilize increasing quantities of ground water per year. The largest increase is between the MSOC and the Bypass Alternatives. With this increased water usage, greater declines of water levels in particular aquifers would occur. Degradation of the quality of shallow ground water may occur. Recharge to shallow aquifers would be decreased locally. An additional concern relates to the possible decrease in water quality caused by acidic deposits from the proposed plants, coal-mine runoff, and other activities associated with the development of coal.

Vegetation, Livestock Grazing, and Livestock Improvements

Short term loss of vegetation (and therefore forage for livestock and wildlife) would generally occur over the life of each mine (20 to 40 years) or until reclamation occurs.

All lands affected by coal mining would be legally required, after mining, to be returned to their approximate original contour and vegetative productivity. Revegetation effort on coal mines in similar areas indicate that mined lands in the EIS Region can be successfully revegetated with proper selection or conditioning of soils and irrigation. However, it should be noted that no lands have been through a full revegetation cycle and returned to grazing use.

Other areas for livestock grazing could be found for Navajo families who would lose their grazing areas while mining is being conducted and until reclamation takes place.

Temporary loss of any grazing areas would be a significant impact unless another area is found, or unless the family is reimbursed for the loss. The full impacts of this situation are hard to predict at this time.

The Bypass Alternative would have the least amount of impact, while the impacts would increase to a much greater extent under the MSOC Alternative. The loss of vegetation acreage nearly doubles from the MSOC to the Target Alternative and then again to the High Alternative, but the increase in loss of forage (AUM's) is only moderate.

The Target and High Alternatives also encompasses the known habitat of state-sensitive species Astragalus wingatus.

Wildlife

Mining would cause the disturbance and destruction of wildlife populations and habitat. The impacts would become more serious as more coal is mined, more habitat is destroyed, and human activity increases in the Region. Comparing the alternatives, the estimated acreages that would be removed from wildlife utilization during the mine life shows substantial increases. Disturbances could occur on 200 to 300 acre of mule deer and elk winter range. The ferruginous hawk (a species of high federal interest), the prairie falcon, and golden eagle, and their possible nesting areas, would be impacted by surface mining; however no new destruction to these species would occur under the MSOC Alternative.

Cultural Resources

The types of cultural resource impacts caused by mining are: possible destruction of uninventoried archaeological sites, vandalism and collection of artifacts due to ease of access into the EIS Region, and possible destruction of portions of the Chacoan roadway system. However, over the past 2 years the Bureau has completed indepth studies on the Chacoan Roads and have extracted a great deal of information about these roads thus having, for the most part, mitigated these sites. Each alternative shows an increase in the number of sites destroyed or disturbed by mining.

Site excavation and other forms of data recovery before mining would result in increased knowledge about past cultures in the EIS Region. However, some sites may have regionally significant values that require special attention in order to preserve important scientific information. Cultural surveys have identified four areas where cultural resources require protection in situ. If other such resources are found, provisions in the lease stipulations will allow for these sites to be preserved in-place. While the Chaco Culture National Historical Park is nearby, mining would not occur in the park itself nor is it expected that mining would directly adversely affect structures in the park. Studies are being conducted on nearby lands to determine the affects of blasting within the park.

Visual Resources

Mining, construction, and use of related facilities would result in reductions in scenic values. The number of acres disturbed, and thus the impacts on scenic values, would increase under each alternative. Another impact

would occur to the Continental Divide National Scenic Trail corridor. In the Bypass, Target and High Alternatives, impacts would occur to a significant number of acres in the Bisti Badlands (outside of the Bisti WSA). No impacts would occur to the Bisti Badlands under the MSOC Alternative.

Wilderness

Mining and associated activities would detract from the naturalness, solitude and visual quality of the EIS Region. Noise would also be disturbing, especially when individuals hope to find a quality wilderness experience.

Recreation

Impacts on dispersed recreational activities and developed sites would include pressures from an increase in population and the extraction of land from recreation use by mining operations. It is felt that sufficient dispersed recreational activity areas and the currently developed sites are adequate to handle the increase in use expected from mining and related activities without substantial overcrowding. Mining activity would be visually distracting and noise pollution would have a detrimental effect on the recreation experience. The impacts to recreation would be commensurate with the level of mining under each of the four alternatives.

Land Uses

Land use impacts would involve the removal or relocation of transmission lines, pipelines, powerlines, roads, and railroads. A tremendous increase in the acreages of right-of-ways affected would occur between the Bypass and the Target Alternatives. Acreage affected would more than double between the Target and the High Alternatives.

Transportation

The impacts on transportation involve increases in the number of accidents, the amount of daily traffic, the demand for new road construction and road maintenance, and the potential for conflicting uses between mining operations, facilities development, and the general public.

The alternatives show that the increase in the number of accidents would be minimal under the Bypass and the MSOC Alternatives. However, more than 36 additional accidents would occur under the Target Alternative and that number would double under the High Alternative. The Average Daily Traffic (ADT) increases in the year 2000 show a large increase between the Bypass and the Minimum Surface Owner Conflict Alternative while the other alternatives show only a slight ADT increase.

Social and Economic Factors

If full development occurs under the No Action Alternative and Preference Right Lease Issuance, it could displace use by Navajo families in the rural part of the EIS Region for livestock grazing. Because coal mining has the potential to foster other industrial development this rural portion of the EIS region will probably see a trend toward industrial development. This could significantly affect the off reservation Navajo lifestyle.

Population would increase in proportion to the levels of coal development, as would available jobs, and the need for infrastructures and community expansion. Other problems associated with large influxes and sharp increases in population would dramatically increase with higher levels of coal development. This would largely affect the small communities in the EIS Region. Farmington has experienced much of this type of impact already due to the oil and gas industry. It has adjusted to these changes and would only be slightly affected by new federal coal leasing.

American Indian Concerns

Residences

One of the major issues for this EIS is the relocation of the American Indian families occupying the PRLA area and adjacent competitive tracts. The social implications involved in relocating these people of traditional life styles are of concern. Every alternative would affect a certain number of known Navajo occupants, the largest increase occurring between the Target and High Alternatives.

Gravesites

In keeping with the Navajo tradition, the belief in witchcraft resulting from the disturbance of gravesites during surface mining could have an affect on Navajo health and behavior. Under each alternative, a number of grave sites in surface mining areas could be destroyed, if not identified and removed (removal constitutes a disturbance) before mining. Gravesite disturbance will be minimized by requiring each lessee to survey the lease for gravesites and to avoid mining within 100 feet of a gravesite unless the gravesite is lawfully relocated.

Sacred Sites

American Indian sacred sites should be identified before they are destroyed by mine facility construction. Mining operations could be a hindrance to religious practice due to population increases, noise, vibration, and dust. Each alternative would affect a number of sacred sites, with the High Alternative affecting the largest site number. These impacts could be minimized through ceremonies conducted by local medicine men.

TABLE 1-7

COMPARISON OF IMPACTS FOR PRLA ALTERNATIVES

Resource	No Action/Exchange PRLAs ^{a/}	Preference Right Lease Issuance	Partial Lease Issuance
<u>Air Quality</u> ^{b/} (New Mexico State TSP 24-hour Ambient Air Quality Standard is 150 ug/m ³)	No significant impacts.	Approximate TSP concentration is 100 ug/m ³ .	Approximate TSP concentration is 100 ug/m ³ .
<u>Topography, Geology, Mineral Resources</u>	Alteration of topography on 25,000 acres. Some subsidence would occur during subsurface mining. Removal of up to 850 million tons of coal.	Alteration of topography on 22,020 acres. Some subsidence on up to 30,000 acres. Removal of up to 1.15 billion tons of coal.	Alteration of topography on approximately 15,435 acres. Some subsidence on approximately 28,270 acres. Removal of approximately 1.02 billion tons of coal.
<u>Paleontology</u>	An estimated 1,100 fossil localities could be destroyed by construction of mining-connected facilities. Population increases and increased access to the region would result in unauthorized collection and vandalism. However, during mining subsurface information would become available.	An estimated 1,137 fossil localities would be destroyed by construction of mining-connected facilities. Other impacts are the same as under the No Action Alternative.	An estimated 1,076 fossil localities could be destroyed by construction of mining facilities. Other impacts are the same as the No Action Alternative.
<u>Soils</u>	About 1,000 acres removed from production by facilities construction, resulting in long-term productivity loss. Over 25,000 acres disturbed by surface mining with short-term acceleration of erosion and sediment yield resulting. Soil mixing, contamination and compaction would also occur.	Over 22,020 acres disturbed by surface mining with short-term acceleration of erosion and sediment yield resulting. With about 705 acres removed from production by facilities construction, resulting in long-term productivity loss. Soil mixing, contamination and compaction would also occur.	Approximately 15,435 acres would be disturbed by surface mining with short-term acceleration of erosion and sediment yield resulting. Approximately 515 acres could be removed from production by facilities construction, resulting in long-term productivity loss. Soil mixing, contamination and compaction would also occur.
<u>Water Resources</u>	Disruption of aquifers and destruction of shallow ground water sources, less recharge to ground water, 3,600 acre-feet of water per year in 1987 and a peak-use in the year 2000 by mining companies of 7,825 acre-feet of water per year. Destruction of existing surface drainage patterns in mined areas.	Approximately 12,850 acre-feet of water per year used during mining process. Other impacts the same as under the No Action Alternative.	Approximately 12,275 acre-feet of water per year used during mining process. Other impacts the same as under the No Action Alternative.
<u>Vegetation</u>	Removal of vegetation on approximately 25,000 acres.	Removal of vegetation on approximately 22,600 acres.	Removal of vegetation on approximately 15,435 acres.
<u>Livestock Grazing and Improvements</u>	Yearly vegetative production on 25,000 acres disturbed estimated at 3,157 AUMs. Short-term annual AUM losses cannot be predicted until mine plans are submitted. Vegetative yield should return to or near full production in the long term.	An estimated 2,032 AUMs lost with 10 dirt reservoirs, 4 wells, 3 cattleguards, 2 corrals, 2 wells, 2 windmills, and 20.5 miles of fence destroyed.	An estimated 1,778 AUMs lost. Other impacts are the same as identified under the No Action Alternative.
<u>Wildlife</u>	Surface mining to exlude about 25,000 acres from use by wildlife until after reclamation. Indirect impacts on wildlife due to increased human activity in region.	An estimated 22,020 acres removed from wildlife utilization during mine life. Possible disturbance to a raptor of high federal interest, 5 ferruginous hawks and 1 prairie falcon. Other impacts are the same as under the No Action Alternative.	Approximately 15,435 acres removed from wildlife utilization during mine life. Other impacts are the same as identified under the No Action Alternative

TABLE 1-7 (CONTINUED)

Resource	No Action/Exchange PRLAs ^{a/}	Preference Right Lease Issuance	Partial Lease Issuance
<u>Cultural Resources</u>	Other projects may destroy between 470 and 950 predicted sites within the coal region. Site excavations and other forms of data recovery prior to mining would result in increased knowledge about past cultures in the region, although timeframes could affect the quality of data recovered. Unmitigated sites and Chacoan roads in surface mining areas destroyed. Mining-related activities and population increases would accelerate damage.	A total of 171 sites identified throughout the PRLA area and 542+ predicted. Other impacts the same as under the No Action Alternative.	Four-hundred and thirty-four sites are predicted to occur. Other impacts are the same as under the No Action Alternative.
<u>Visual Resources</u>	Mining, construction, and use of related facilities would reduce the scenic values on 25,000 acres during a period of 20 to 40 years and longer.	An estimated 22,020 acres would be affected in the same way as under the No Action Alternative. Impacts would occur to the Continental Divide National Scenic Trail corridor.	An estimated 15,435 acres would be affected in the same way as under the No Action Alternative. Impacts could occur to the Continental Divide National Scenic Trail corridor.
<u>Wilderness</u>	Mining and associated activities would detract from the quality of the wilderness experience due to noise and visual distractions.	Impacts the same as under the No Action Alternative.	Impacts the same as under the No Action Alternative.
<u>Recreation</u>	Increased demand for recreation in the region, increased pressures on outside recreation areas due to population increase, and extraction of land from recreation use due to mining operations. Mining activities would detract from the quality of the recreation experience due to noise and visual impacts.	Impacts the same as under the No Action Alternative.	Impacts the same as under the No Action Alternatives.
<u>Land Use</u>	Removal or relocation of an unknown number of rights-of-ways, including roads, powerlines, pipelines, transmission lines and railroads.	An estimated 379 acres affected; type of impacts the same as under the No Action Alternative.	Impacts the same as under the No Action Alternative.
<u>Transportation</u>	Increases in accidents, daily traffic, road maintenance, and new road construction. Accidents increased by more than 2 and Average Daily Traffic (ADT) by more than 387 by the year 2000.	Accidents increased by more than 89 and ADT by more than 4,190 in the year 2000.	Impacts the same as under the PRLA Alternative.
<u>Social and Economic Conditions</u>	Population could increase by 13,738 people (25%) in Farmington in 1987 over the 1980 base population and 361 people (59%) in Cuba in 1987. Total employment could increase by up to 764 jobs (12%) in Crownpoint-Thoreau area in 1987 to 313 jobs (60%) in Cuba in 1987. In the year 2000 an increase of 933 jobs (27%) could occur in Crownpoint-Thoreau area and 535 jobs (173%) in Cuba. These figures are above the 1980 base figure.	Population could increase by 1,923 people (116%) in Cuba in the year 2000. Employment could increase by 5,191 jobs (16%) in Farmington and 1,731 jobs (324%) in Cuba in the year 2000. Lifestyles and cultural and religious values for Navajo people living on or near the PRLA's could be disrupted. Expansion of community infrastructure would be necessary.	Impacts the same as under the PRLA Alternative.

TABLE 1-7 (CONTINUED)

Resource	No Action/Exchange PRLAs ^{a/}	Preference Right Lease Issuance	Partial Lease Issuance
<u>American Indian Concerns</u>			
Residences	The number of Navajo American Indian families occupying the area and adjacent land is unknown.	Thirty-nine (39) Navajo American Indian families occupying the PRLA area and adjacent land relocated.	Fourteen (14) Navajo American Indian families occupying the PRLA area and adjacent land relocation.
Gravesites	An unknown number of gravesites in surface mining areas could be destroyed if not identified. Belief in witchcraft occurring due to gravesite disturbance could have a profound effect on Navajo health and behavior.	On 11 known gravesites the lessee would have to get permission to move the gravesites or an area 100 feet surrounding the site could not be mined. The impacts to unknown gravesites would be the same as under the No Action Alternative.	Impacts the same as under the PRLA Alternative.
Sacred Sites	An unknown number of sacred sites could be destroyed by surface mining and facilities construction if not recognized ahead of time. Population increases and noise, vibration, and dust from mining would cause adverse effects.	On 4 known sacred sites impacts the same type as under the No Action Alternative.	Impacts the same as under the PRLA Alternative.

Notes: ^{a/} This assumes that the PRLAs would be exchanged for coal outside the San Juan Basin. (If bidding rights are used on coal tract within the San Juan Basin then the impacts would remain the same as analyzed in the various leasing alternatives; the impacts on the exchange area are too speculative at this time because we have no way of determining how the applicant would use the certificate.)

^{b/} Figures for air quality are cumulative, they include the No Action Alternative.

TABLE 1-8

COMPARISON OF IMPACTS,
COMPETITIVE LEASING ALTERNATIVES a/

Resource	No Action c/	Bypass	Minimum Surface Owner Conflicts	Target d/	High e/
<u>Air Quality b/</u> (New Mexico State TSP 24-hour Ambient Air Quality Stand- ard is 150 ug/m ³)	Reduction in visual, range, air quality standard not exceeded.	Could exceed New Mexico State 24-hour ambient air standard by 13 ug/m ³ unless Best Available Technology (BACT) is applied.	Could exceed New Mexico State 24-hour ambient air standard by 84 ug/m ³ unless BACT is applied.	Could exceed New Mexico State 24-hour ambient air standard by 84 ug/m ³ unless BACT is applied.	Could exceed New Mexico State 24-hour ambient air standard by 86 ug/m ³ unless BACT is applied.
<u>Topography, Geology, Mineral, Resources</u>	Alteration of topography on 47,020 acres. Some subsidence on up to 30,000. Removal of up to 2 billion tons of coal.	Alteration of approximately 6,130 acres. Removal of approximately 282.0 million tons of coal (113 million tons federal). No subsidence.	Alteration of approximately 19,302 acres. Removal of approximately 703 million tons of coal (350 million tons federal). Subsidence on up to 21,000 acres.	Alteration of approximately 35,977 acres. Removal of approximately 1.2 billion tons of coal (696 million tons federal). Subsidence on up to 21,000 acres.	Alteration of approximately 68,641 acres. Removal of approximately 1.67 billion tons of coal (1.09 billion tons federal). Subsidence on up to 37,081 acres.
<u>Paleontology</u>	An estimated 2,237 fossil localities could be destroyed by construction of mining- connected facilities. Population increases and increased access to the region would result in unauthorized collection and vandalism. However, during mining some subsurface information would become available.	An estimated 271 fossil localities disturbed. Other impacts the same as under the No Action Alternative.	An estimated 136 fossil localities disturbed. Other impacts the same as under the No Action Alternative.	An estimated 1,400 fossil localities disturbed. Other impacts the same as under the No Action Alternative.	An estimated 1,693 fossil localities disturbed. Other impacts the same as under the No Action Alternative.
<u>Soils</u>	About 1,705 acres removed from production by facilities con- struction, resulting in long- term productivity loss. Over 47,020 acres disturbed by surface mining with short-term acceleration of erosion and sediment yield resulting. Soil mixing, contamination and compaction would also occur.	About 6,130 acres disturbed by surface mining, and 600 acres by underground mining and surface facilities. Type of impacts the same as under the No Action Alternative.	About 19,302 acres disturbed by surface mining, and 1,050 acres by underground mining and surface facilities. Type of impacts the same as under the No Action Alternative.	About 35,977 acres disturbed by surface mining, and 2,100 acres by underground mining and surface facilities. Type of impacts the same as under the No Action Alternative.	About 68,641 acres disturbed by surface mining, and 3,500 acres by underground mining and surface facilities. Type of impacts the same as under the No Action Alternative.
<u>Water Resources</u>	Disruption of aquifers and destruction of shallow ground water sources, less recharge to ground water. A peak-use in the year 2000 by mining companies of 20,675 acre-feet of water per year. Destruction of existing surface drainage patterns in mined areas.	Approximately 380 acre-feet of water per year used during mining process. Other impacts the same as under the No Action Alternative.	Approximately 2,500 acre-feet of water per year used during mining process. Other impacts the same as under the No Action Alternative.	Approximately 3,700 acre-feet of water per year used during mining process. Other impacts the same as under the No Action Alternative.	Approximately 4,650 acre-feet of water per year used during mining process. Other impacts the same as under the No Action Alternative.
<u>Vegetation</u>	Removal of vegetation on approximately 47,020 acres.	Removal of vegetation on approximately 6,130 acres.	Removal of vegetation on approximately 19,302 acres.	Removal of vegetation on approximately 35,977 acres.	Removal of vegetation on approximately 68,641 acres.
<u>Livestock Grazing and Improvements</u>	An estimated 5,189 AUMs lost Short-term annual AUM losses cannot be predicted until mine plans are submitted. Vegeta- tive yield should return to or near full production in the long term.	An estimated 603 AUMs lost, with 4 reservoirs and 2 miles of fence destroyed or removed and 1 well.	An estimated 4,268 AUMs lost, with 9 reservoirs and 13 miles of fence destroyed or removed, 6 wells and 1 spring.	An estimated 6,045 AUMs lost, with 15 reservoirs and 31 miles of fence removed or destroyed, 9 wells and 1 spring. State sensitive species <u>Astragalus</u> <u>wingatus</u> impacted.	An estimated 9,977 AUMs lost, with 28 reservoirs, 73 miles of fence and a corral removed or destroyed, 17 wells and 1 spring. State sensitive species <u>Astragalus wingatus</u> impacted.
<u>Wildlife</u>	Surface mining to exclude about 47,020 acres from use by wildlife until after reclama- tion. Indirect impacts on wildlife due to increased human activity in region.	An estimated 6,130 acres removed from wildlife utilization, and 200 acres of deer and elk winter range disturbed. Possible disturbance of 1 ferruginous hawk and nesting areas.	An estimated 19,302 acres removed from wildlife utilization during mine life. Possible disturbance on 200 acres of wintering mule deer and elk range. Possible disturbance of 1 golden eagle.	An estimated 35,977 acres re- moved from wildlife utilization during mine life. Possible disturbance on 200 acres of wintering mule deer and elk range. Possible disturbance of 2 golden eagle nests and 2 ferruginous hawks and nesting areas.	An estimated 68,641 acres re- moved from wildlife utiliza- tion during mine life, and 300 acres of mule deer and elk winter range impacted. Possible disturbance of 2 golden eagle nests and 2 ferruginous hawks and nesting areas.

TABLE 1-8 (CONTINUED)

Resource	No Action g/	Bypass	Minimum Surface Owner Conflicts	Target d/	High e/
<u>Cultural Resources</u>	A total of 171 sites identified, with 1,012 to 1,492 sites predicted within the coal region. Site excavations and other forms of data recovery prior to mining would result in increased knowledge about past cultures in the region, although timeframes could affect the quality of data recovered. Unmitigated sites and Chacoan roads in surface mining areas destroyed. Mining-related activities and population increases would accelerate damage.	A total of 28 sites identified, with 165 to 188 sites predicted. Portions of Chacoan roads destroyed. Other impacts the same as under the No Action Alternative.	A total of 213 sites identified, with 600 to 708 sites predicted. Portions of Chacoan roads destroyed. Other impacts the same as under the No Action Alternative.	A total of 412 sites identified, with 814 to 1,105 sites predicted. Portions of Chacoan roads destroyed. Other impacts the same as under the No Action Alternative.	A total of 638 sites identified, with 1,727 to 2,295 sites predicted. Portions of Chacoan roads destroyed. Other impacts the same as under the No Action Alternative.
<u>Visual Resources</u>	Mining, construction, and use of related facilities would reduce the scenic values on 47,020 acres during a period of 20 to 40 years and longer. Impacts would occur to the Continental Divide National Scenic Trail corridor.	An estimated 6,130 acres would be affected in the same way as under the No Action Alternative. Significant impacts would occur to 3,040 acres in Bisti Badlands (VRM Class III - IV).	An estimated 19,302 acres (VRM Class III - IV) would be affected in the same way as under the No Action Alternative.	An estimated 35,977 (VRM Class III - IV) acres would be affected in the same way as under the No Action Alternative. Significant impacts would occur to 4,070 acres in Bisti Badlands.	An estimated 68,641 (VRM Class III - IV) acres would be affected in the same way as under the No Action Alternative. Significant impacts would occur to 4,070 acres in Bisti Badlands.
<u>Wilderness</u>	Mining and associated activities would detract from the quality of the wilderness experience due to noise and visual distractions.	Impacts the same as under the No Action Alternative.	Impacts the same as under the No Action Alternative.	Impacts the same as under the No Action Alternative.	Impacts the same as under the No Action Alternative.
<u>Recreation</u>	Increased demand for recreation in the region, increased pressures on outside recreation areas due to population increase, and extraction of land from recreation use due to mining operations. Mining activities would detract from the quality of the recreation experience due to noise and visual impacts.	Impacts the same as under the No Action Alternative.	Impacts the same as under the No Action Alternative.	Impacts the same as under the No Action Alternative.	Impacts the same as under the No Action Alternative.
<u>Land Use</u>	Removal or relocation of an unknown number of rights-of-ways, including roads, powerlines, pipelines, transmission lines and railroads.	An estimated 13 acres affected; type of impacts the same as under the No Action Alternative.	An estimated 205 acres affected; type of impacts the same as under the No Action Alternative.	An estimated 363 acres affected; type of impacts the same as under the No Action Alternative.	An estimated 811 acres affected; type of impacts the same as under the No Action Alternative.
<u>Transportation</u>	Increases in accidents, daily traffic, road maintenance, and new road construction. Accidents increased by more than 91 and Average Daily Traffic (ADT) by more than 4,477 by the year 2000.	Accidents increased by more than 6, and ADT by more than 310 in the year 2000.	Accidents increased by more than 13, and ADT by more than 2,643 in the year 2000.	Accidents increased by more than 39, and ADT by more than 3,310 in the year 2000.	Accidents increased by more than 64, and ADT by more than 4,397 in the year 2000.
<u>Social and Economic Conditions</u>	Population could increase by 13,738 people (25%) in Farmington in 1987 over the 1980 base population and 2,284 people 175% in Cuba in 1987 by the year 2000. An increase of 933 jobs (27%) could occur in Crownpoint/Thoreau area and 2,266 (497%) jobs in Cuba. Employment would increase by 5,191 jobs (16%) in Farmington. Lifestyles and cultural and religious values for Navajo people living on or near the FRIA's would be disrupted. Expansion of community infrastructures would be necessary.	Population could increase by 1,923 people (116%) in Cuba in the year 2000. Employment could increase by 1,731 jobs (324%) in Cuba in the year 2000. Other impacts would be the same type as under the No Action Alternative.	Population could increase by 2,977 people (15%) in Grants and 2,977 (31%) in Milan in the year 2000. Employment could increase by 3,070 jobs (10%) in Farmington, by 2,680 (33%) in Grants, and 2,680 (102%) in Milan in the year 2000. Other impacts would be the same type as under the No Action Alternative.	Population could increase by 859 people (52%) in Cuba, 4,230 (21%) in Grants, 5,461 (21%) in Gallup, 4,230 (64%) in Milan, and 3,342 (110%) in Crownpoint/Thoreau. Employment could increase by 4,005 jobs (13%) in Farmington, 2,156 (403%) in Cuba, 3,807 (47%) in Grants, 4,454 (56%) in Gallup, 3,807 (145%) in Milan and 3,008 (65%) in Crownpoint/Thoreau. Other impacts would be the same type as under the FRIA Lease Issuance Alternative.	Population could increase by 2,573 people (155%) in Cuba, 4,230 (21%) in Grants, 5,461 (21%) in Gallup, 4,230 (64%) in Milan, and 3,342 (110%) in Crownpoint/Thoreau. Employment could increase by 4,005 jobs (13%) in Farmington, 2,156 (403%) in Cuba, 3,807 (47%) in Grants, 4,454 (56%) in Gallup, 3,807 (145%) in Milan and 3,008 (65%) in Crownpoint/Thoreau. Other impacts would be the same type as under the FRIA Lease Issuance Alternative.

TABLE 1-8 (CONTINUED)

Resource	No Action <u>c/</u>	Bypass	Minimum Surface Owner Conflicts	Target <u>d/</u>	High <u>e/</u>
American Indian Concerns					
Residences	Thirty-nine (39) Navajo American Indian families occupying the FRIA area and adjacent land relocated.	Approximately four Navajo families relocated.	Approximately twenty-three Navajo families relocated.	Approximately seventy Navajo families relocated.	Approximately four-hundred fifty-five Navajo families relocated.
Gravesites	Eleven (11) known gravesites in surface mining areas could be destroyed if not identified and removed before mining. Belief in witchcraft occurring due to gravesite disturbance could have a profound effect on Navajo health and behavior.	On 3 known gravesites, impacts the same type as under the No Action Alternative.	No known gravesites, impacts the same type as under the No Action Alternative.	On 23 to 33 known gravesites, impacts the same type as under the No Action Alternative.	On 25 to 35 known gravesites, impacts the same type as under the No Action Alternative.
Sacred Sites	Four (4) known sacred sites in the FRIA area could be destroyed by surface mining and facilities construction if not recognized ahead of time. Population increases and noise, vibration, and dust from mining would cause adverse effects.	On one known sacred site impacts the same type as under the No Action Alternative.	No known sacred sites, impacts the same type as under the No Action Alternative.	On three known sacred sites, impacts the same type as under the No Action Alternative.	On four known sacred sites, impacts the same type as under the No Action Alternative.

Notes: a/ Impacts are attributable solely to a particular alternative or action. (See Preface.)

b/ Figures for air quality are cumulative, they include the No Action Alternative.

c/ Assumes the issuance of FRIAs.

d/ The intensity and duration of impacts are greater than that of the No Action Alternative.

e/ The intensity and duration of impacts are greater than that of the Target Alternative.

CHAPTER 2

AFFECTED ENVIRONMENT

CHAPTER 2

AFFECTED ENVIRONMENT

INTRODUCTION

This chapter describes the resource components of the environment that would be impacted by the proposed mining of coal on 39^{1/} competitive coal lease tracts and 26 Preference Right Lease Applications in the San Juan River Region (also called the "EIS Region"). The level of detail in the descriptions corresponds with the expected magnitude and intensity of the impacts discussed in Chapter 3. Technical material supporting these descriptions and the analysis in Chapter 3 is located in the Appendix of this document, or is on file and available for public review at the BLM Farmington Resource Area Office.

CLIMATE

The major portion of the San Juan River Region is characterized by generally clear, sunny skies and a semi-arid climate. The general elevation of the EIS Region is about 5,000 feet, with a significant portion greater than 7,000 feet. The high elevation and generally clean dry air combine to give large daily temperature fluctuations. The average maximum temperatures vary from 67 to 88 degrees Fahrenheit, with average minimum temperatures between 35 and 65 degrees. Daytime summer temperatures above 100 degrees are coupled with near-freezing temperatures at night. The average number of frost-free days is 140, with a range of less than 100 to more than 160, depending on location.

The annual precipitation varies between 8 and 14 inches; however, due to evapotranspiration losses, an annual moisture deficit of 10 to 12 inches occurs. During the growing season, the average precipitation varies from 4 inches in the northwest portion of the EIS Region to over 6 inches in the southwest portion. The extremes for growing season precipitation are 4 and 15 inches. These variations occur both geographically and yearly, and they result from differences in elevation and topography.

These latter differences cause variations in the prevailing wind direction and speed. Winds in the Gallup vicinity are predominantly from the southwest, while the winds measured in Farmington come from the east-northeast and the west.

In general, the lack of moisture received during the growing season may make reclamation in the EIS Region more difficult than in other parts of the country.

^{1/} (See Preface.)

AIR QUALITY

The Environmental Protection Agency (EPA) has divided the country into Air Quality Control Regions (AQCR). The EIS Region lies mostly within the Four Corners Air Quality Control Region 14. New Mexico has designated this AQCR as State Region Number 1. A small portion of the EIS Region, in the vicinity of the Chaco Wash and Lee Ranch tracts, is in AQCR 156 or State Region Number 8. All AQCRs are classified either as "attainment areas" (they meet the national ambient air quality standards) or as "non-attainment areas" (they exceed the standards). Both of the AQCRs overlapping the EIS Region (14 and 156) are classified as attainment areas for total suspended particulates (TSP).

The annual background level of TSP is considered to be 30 micrograms per cubic meter (ug/m^3). The annual primary federal standard is 75 ug/m^3 maximum, and the annual New Mexico state standard is 60 ug/m^3 . The 24-hour New Mexico state standard is 150 ug/m^3 . None of these standards are normally exceeded in the EIS Region, making the AQCRs attainment areas for TSP.

Particulate matter (TSP) is usually the only pollutant generated in large enough quantities by surface mines to have a significant impact on regional air quality. Other pollutants such as nitric oxide (NO) and sulfur dioxide (SO_2) are not considered problems resulting from coal mining.

All new emission sources in an attainment area must be examined to determine if they are subject to the PSD regulations. Coal mines are subject to the PSD permit process if they have a potential to emit more than 250 tons per year of any air pollutant. Surface coal mines seldom exceed this level of emissions. Fugitive emissions (in this case TSP) are tracked in this EIS, even though the mines probably are not subject to obtaining a PSD permit.

Under the PSD regulations, the San Pedro Parks Wilderness Area (managed by the U.S. Forest Service), and the Mesa Verde National Park are designated as Class I areas for air quality. (Class I areas have stringent limits on increased concentrations of sulfur dioxide and TSP, and are also given protection from visibility degradation.) Because of the distance of these Class I areas from the EIS Region and the relatively short distance TSP will travel from mining operations (generally less than 20 kilometers), these areas are considered to be outside of the EIS Region.

Under natural conditions, the EIS Region is subject to periods of blowing dust. The amount of dust in the air is dependent on several factors, such as wind speed and moisture content of the soil. These periods of blowing dust reduce visibility for the duration of the dust storms, and at times the ambient TSP standards are exceeded due to these natural conditions. Very limited data exists on the visibility in the EIS Region, and most of it is based on measurements taken at the Chaco Culture National Historical Park. This data shows the visual range to average about 127 miles. Ninety percent of the time the visual range is 160 miles or less, and 10 percent of the time it is 85 miles or less. A more detailed discussion of the visibility, and how it was calculated is found in Appendix G-1.

However, other data shows that the visibility in the San Juan Basin is in the range of 70-80 miles. (Trijonnis). The 73 mile value obtained using the

Ursenbach method, agrees with this value and is used as the current conditions in this document (Appendix G). This method uses the particulate level as the basis for the calculation of visibility, whereas the National Park Service used a contrast rating system which are based on actual measurements of contrast reductions made with a teleradiometer located at Chaco Cultural National Historical Park.

The EIS Region experiences air inversions nearly 70 percent of the time. However, these inversions usually are dispersed by daytime surface heating. The region generally experiences a deep air mixing level, which disperses pollutants.

TOPOGRAPHY AND GEOLOGIC HAZARDS

Topography

The San Juan River Region lies within the San Juan topographic and structural basin. The central part of the basin is a dissected plateau, the surface of which slopes gently west, and is characterized by low mesas, buttes and broad cuerdas. The Bisti Badlands (barren, colorful shale hills and gulleys) are notable. The Continental Divide wanders through the EIS Region in a northeast to northerly direction and is generally expressed as a subdued ridge, little more prominent than many other ridges or nearby mesas. The principal streams have cut into the semi-arid plateau to form steep-walled canyons.

Geologic Hazards

Ground subsidence has occurred as a result of underground mining in the Ambrosia Lake Uranium District, an area 5 to 6 miles south of the Lee Ranch tracts (refer to Visual C enclosed with the Draft EIS, for the location of these tracts). Additional collapse over old mine workings is possible in this district. Subsidence from natural causes is known around "pipes" in the shale in badland areas of the Fruitland and Kirtland Formations. The uneven erosion of the alternating sandstone and shales of Cretaceous age presents opportunity for slope failures and rockfalls.

MINERAL RESOURCES

Coal Stratigraphy

"Coal deposits are present in the back-shore facies of every one of the transgressive and regressive marine sandstones of the San Juan basin from the Dakota Sandstone through the Gallup Sandstone Crevasse Canyon Formation, the Mesaverde Group, and the Fruitland Formation. Coal has been commercially mined from all of these units" (Fassett, 1976, p. 190). In this EIS Region, the Dakota Sandstone is not known to contain commercial coal; however, the other coal-bearing units do contain commercial coal. Most of the Upper Cretaceous coal formed in swamps that bordered the shore of an interior sea.

The Crevasse Canyon Formation contains two coal-bearing units: the Dilco Member and the Gibson Member (Figure 2-1). These units occur only in the southern part of the ES area, as shown on Figure 2-2. The Mesaverde Group also

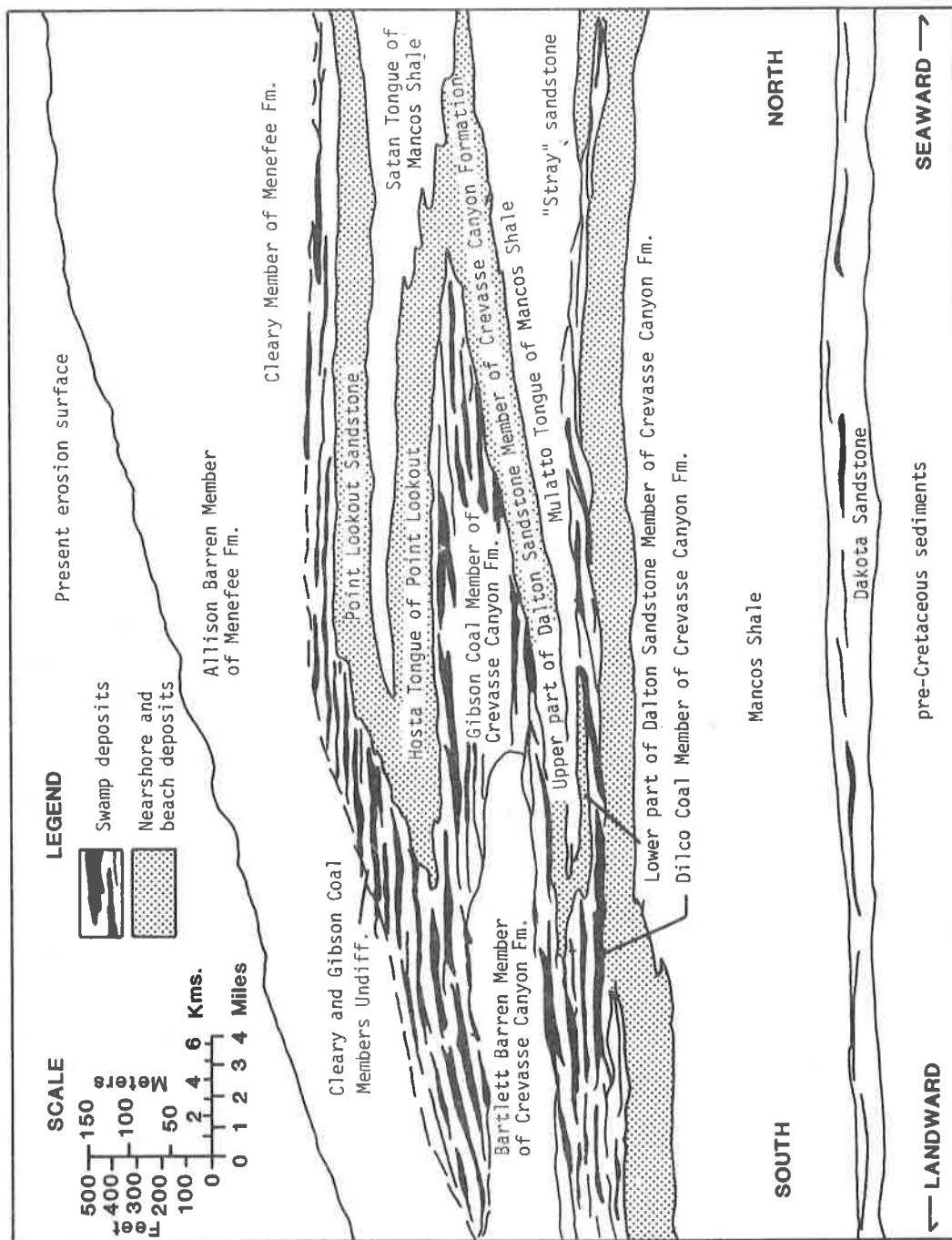


Figure 2-2. Generalized Cross Section of Coal Beds Near Gallup Source: Beaumont, Shoemaker, and Kottlowski, 1971

contains two coal bearing units (Figure 2-1 and Map 2-1); these units are located in the lower most and upper most hundred feet of the Menefee Formation and are in formally called the "lower coal member" and "upper coal member" throughout most of the basin. In the southwest part of the basin, the lower coal member of the Menefee Formation is formally named the Cleary Coal Member. Part of the upper coal member of the Menefee has been formally named the "Hogback Mountain Tongue" in part of the San Juan Basin. The Menefee crops out mainly in the southern part of the EIS area, as shown on Map 2-1.

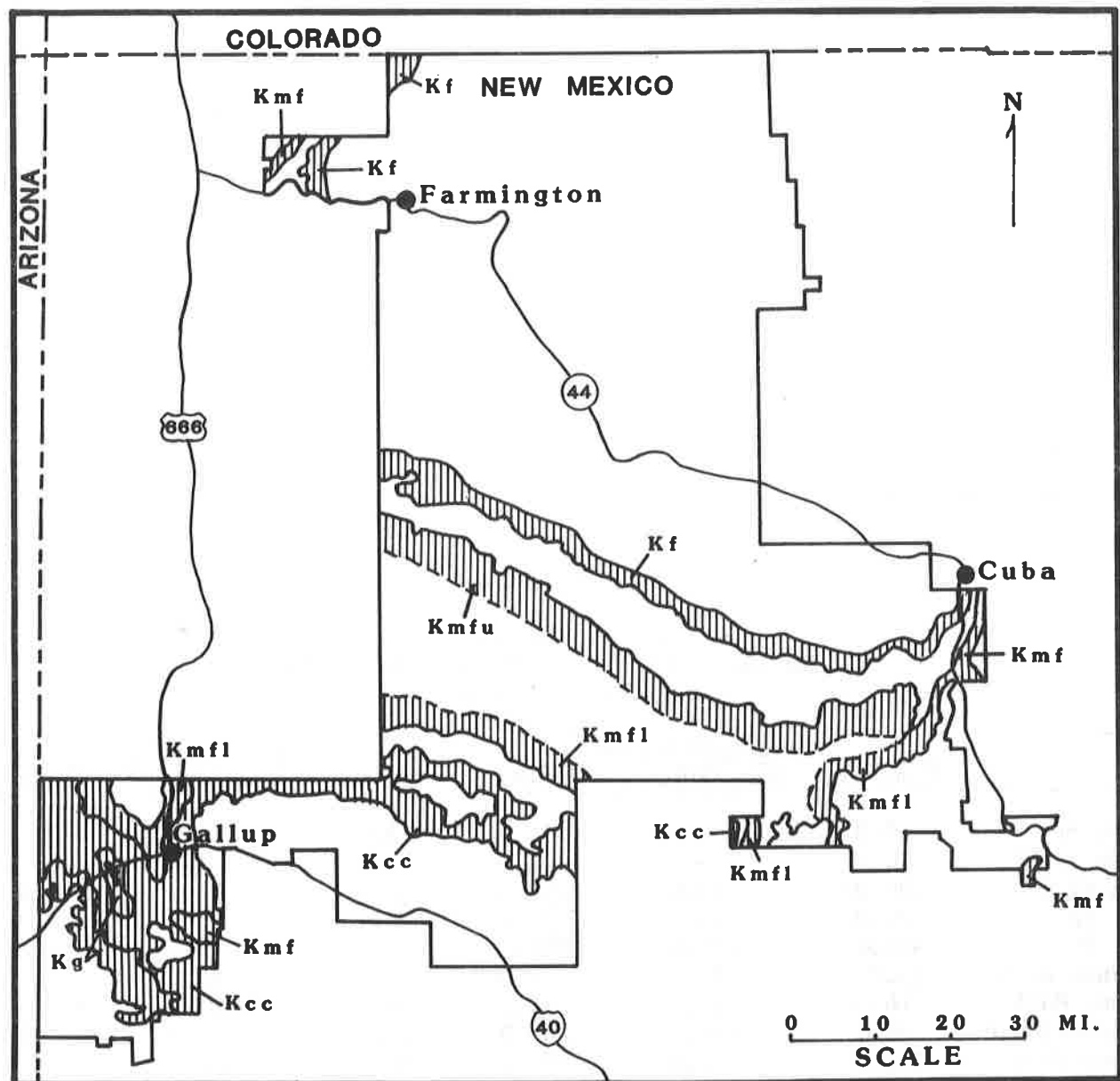
Throughout most of the EIS Region, the Point Lookout Sandstone separates the lower Menefee coal member (Cleary Member) from the coal bearing Gibson Member of the Crevasse Canyon Formation. In the southwest part of the basin, however, where the Point Lookout is absent, these two coal-bearing units come together and cannot be physically differentiated (Figure 2-1).

The Fruitland Formation contains by far the largest coal resources of the EIS Region, in excess of 200 billion tons according to Fassett and Hinds (1971). Of this 200 billion tons, 7 to 10 billion tons may ultimately be stripable. The Fruitland Formation is the stratigraphically highest of the Upper Cretaceous coal-bearing units of the San Juan basin, having formed as the sea made its final retreat from the area. Although coal occurs throughout the Fruitland, the thickest coal beds are concentrated in the lowermost one-third of the formation. The Fruitland Formation crops out principally in the central part of the EIS Region, as shown on Map 2-1. Fassett and Hinds (1971) discuss the Fruitland Formation in great detail and the interested reader is directed to their report for more information.

In general, the coal deposits of all the above mentioned coal-bearing units have the following similar characteristics: 1) The thickest coal occurs adjacent to and southwest of major stratigraphic rises of adjacent marine strandline sandstone. 2) The coal occurs in elongate tabular bodies whose long axes trend northwest parallel to the strandlines. 3) Coal beds often inter-tongue with the pinch out into marine rocks to the northeast and grade southwestward into flood-plain deposits. In a relative sense, coal beds of the Gallup Formation Crevasse Canyon Formation and the Menefee Formation are much thinner and are more discontinuous than are coal beds of the Fruitland Formation. Fruitland coal beds are commonly ten to twenty feet thick and occasionally attain a thickness of up to forty feet. Gallup, Crevasse Canyon and Menefee coals rarely reach ten feet in thickness, and more often are on the order of six feet or less. With only very rare exceptions, where the Fruitland Formation is present, it contains commercial coal beds. This contrasts with the Crevasse Canyon and Menefee Formations which contain commercial coal deposits only in scattered areas. The reader is referred to Tables 2-1 through 2-4 for the projected amounts of coal in the competitive coal lease tracts by alternative.

Structure

The San Juan Basin is a structural depression bounded on four sides by uplifted parts of the earth's crust: on the north, the San Juan Uplift; on the east, the Nacimiento Uplift; on the south, the Zuni Uplift; on the west, the Defiance Uplift, as shown on Map 2-2. The basin is asymmetrical, being deepest in the northeast part. The structure of the basin is shown on the map by contour lines drawn on the base of the Dakota Sandstone.



MAP 2-1
OUTCROP OF COAL-BEARING ROCKS IN
THE EIS REGION (PATTERNED AREAS)

NOTE: THESE AREAS DO NOT EVERYWHERE CONTAIN COMMERCIAL COAL.
 (Kcc-CREVASSE CANYON FORMATION, Kmf-MENEFEE FORMATION,
 Kmfl-LOWER COAL-BEARING MEMBER OF MENEFEE FORMATION,
 Kmfu-UPPER COAL-BEARING MEMBER OF MENEFEE FORMATION,
 Kf-FRUITLAND FORMATION, Kg-GALLUP FORMATION.)

Source: USDI, 1979 B1st1 - Star Lake Regional Coal EIS

TABLE 2-1

COAL RESOURCES,
BYPASS ALTERNATIVE
(millions of tons)

Tract	Reserve/Resource			Recoverable		
	Federal	Non-Federal	Total	Federal	Non-Federal	Total
La Plata #1	9.0	---	9.0	8.0	---	8.0
Star Lake West #2	28.0	---	28.0	24.0	---	24.0
Kimbeto #2	20.0	---	20.0	18.0	---	18.0
Gallo Wash #1	11.0	---	11.0	10.0	---	10.0
Bisti #6/8	1.0	---	1.0	1.0	---	1.0
Hospah #1	22.0	196.0	218.0	19.0	167.0	186.0
Gamerco #1 (HC)	3.0	1.0	4.0	3.0	1.0	4.0
Bisti #4	35.0	1.0	36.0	30.0	1.0	31.0
TOTALS	129.0	198.0	327.0	113.0	169.0	282.0

Source: Developed from USDI, MMS Tract Delineation Reports, 1982.

TABLE 2-2

COAL RESOURCES,
MINIMUM SURFACE OWNER CONFLICTS ALTERNATIVE
(millions of tons)

Tract	Reserve/Resource			Recoverable		
	Federal	Non-Federal	Total	Federal	Non-Federal	Total
La Plata #1	9.0	---	9.0	8.0	---	8.0
La Plata #2 <u>a/</u>	12.0	---	12.0	2.0	---	2.0
Kimbeto #1 <u>a/</u>	145.0	13.0	158.0	38.0	3.0	41.0
Kimbeto #2	20.0	---	20.0	18.0	---	18.0
Nageezi <u>a/</u>	466.0	121.0	587.0	83.0	26.0	109.0
Gallo Wash #2 <u>a/</u>	35.0	40.0	75.0	9.0	10.0	19.0
Lee Ranch East	16.0	22.0	38.0	14.0	19.0	33.0
Lee Ranch Middle	86.0	154.0	240.0	73.0	131.0	204.0
Lee Ranch West	101.0	137.0	238.0	86.0	116.0	202.0
Divide	16.0	27.0	43.0	14.0	23.0	37.0
Hospah #2 <u>a/</u>	10.0	49.0	59.0	5.0	25.0	30.0
TOTALS	916.0	563.0	1,479.0	350.0	353.0	703.0

Source: Developed from USDI, MMS Tract Delineation Reports, 1982.

Note: a/ Underground tract

TABLE 2-3

COAL RESOURCES,
TARGET ALTERNATIVE
(millions of tons)

Tract	Reserve/Resource			Recoverable		
	Federal	Non-Federal	Total	Federal	Non-Federal	Total
La Plata #1	9.0	—	9.0	8.0	—	8.0
La Plata #2 <u>a/</u>	12.0	—	12.0	2.0	—	2.0
Star Lake West #2	28.0	—	28.0	24.0	—	24.0
Kimbeto #1 <u>a/</u>	145.0	13.0	158.0	38.0	3.0	41.0
Kimbeto #2	20.0	—	20.0	18.0	—	18.0
Nageezi <u>a/</u>	466.0	121.0	587.0	83.0	26.0	109.0
Gallo Wash #1	11.0	—	11.0	10.0	—	10.0
Gallo Wash #2 <u>a/</u>	35.0	40.0	75.0	9.0	10.0	19.0
Bisti #6/8	1.0	—	1.0	1.0	—	1.0
Lee Ranch East	16.0	22.0	38.0	14.0	19.0	33.0
Lee Ranch Middle	86.0	154.0	240.0	73.0	131.0	204.0
Lee Ranch West	101.0	137.0	238.0	86.0	116.0	202.0
Divide	16.0	27.0	43.0	14.0	23.0	37.0
Hospah #1	22.0	196.0	218.0	19.0	167.0	186.0
Hospah #2 <u>a/</u>	10.0	49.0	59.0	5.0	25.0	30.0
Gamerco #1 (HC)	3.0	1.0	4.0	3.0	1.0	4.0
Bisti #4	35.0	1.0	36.0	30.0	1.0	31.0
Johnson Trading Post	17.0	2.0	19.0	14.0	2.0	16.0
Star Lake East #1	61.0	6.0	67.0	52.0	5.0	57.0
Bisti #1	150.0	—	150.0	127.0	—	127.0
Bisti #2	64.0	—	64.0	54.0	—	54.0
Catalpa Canyon	0.4	8.0	8.4	.3	7.0	7.3
Sundance	4.0	1.0	5.0	3.0	1.0	4.0
Samson Lake #2/2	11.0	14.0	25.0	9.0	12.0	21.0
TOTALS	1,323.4	792.5	2,115.4	696.3	549.0	1,245.3

Source: USDI, MMS Tract Delineation Reports, 1982.

Note: a/ Underground tracts

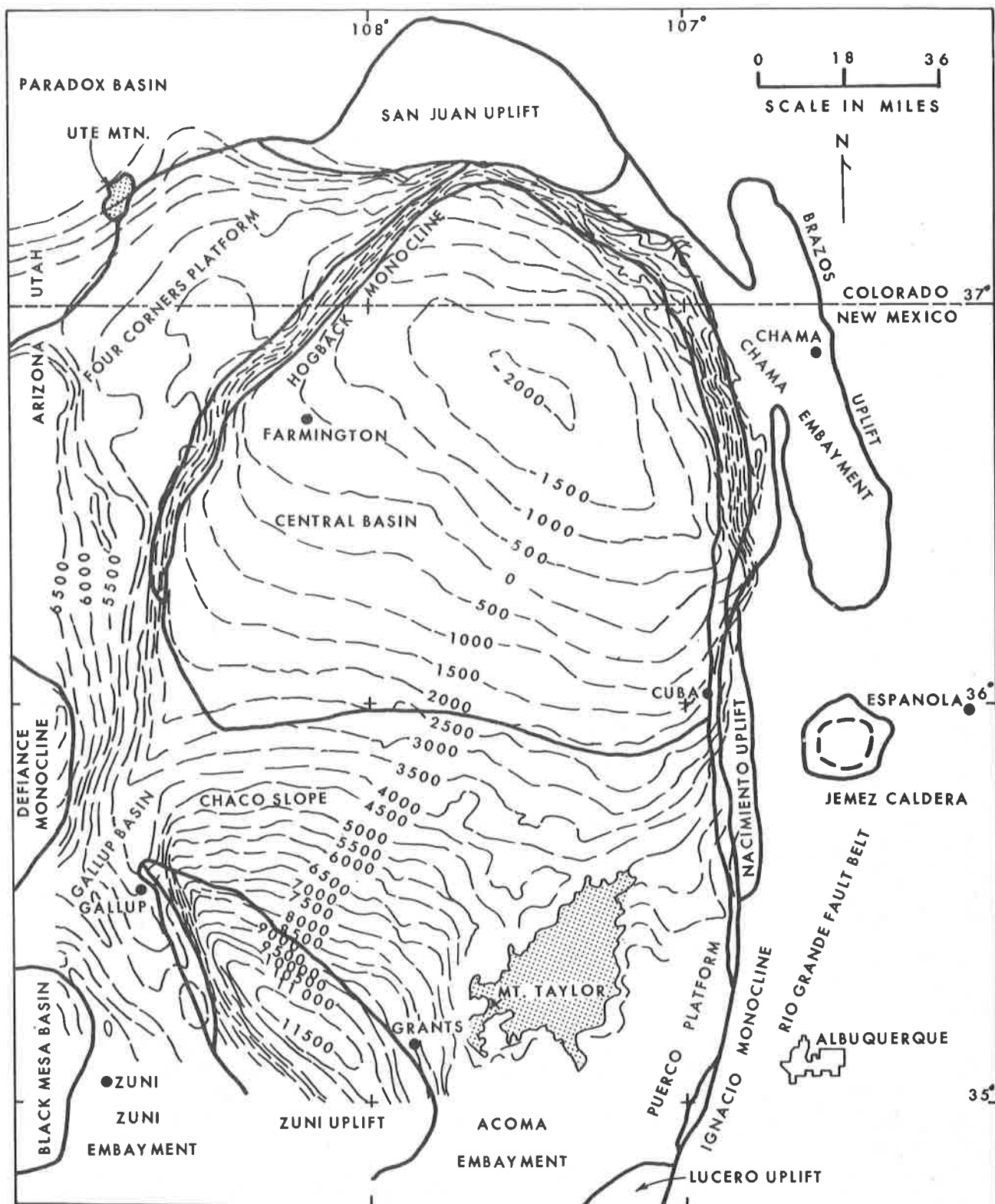
TABLE 2-4

COAL RESOURCES
HIGH ALTERNATIVE
(millions of tons)

Tract	Reserve/Resource			Recoverable		
	Federal	Non-Federal	Total	Federal	Non-Federal	Total
La Plata #1	9.0	—	9.0	8.0	—	8.0
La Plata #2 <u>a/</u>	12.0	—	12.0	2.0	—	2.0
Star Lake West #2	28.0	—	28.0	24.0	—	24.0
Kimbeto #1 <u>a/</u>	145.0	13.0	158.0	38.0	3.0	41.0
Kimbeto #2	20.0	—	20.0	18.0	—	18.0
Nageezi <u>a/</u>	466.0	121.0	587.0	83.0	26.0	109.0
Gallo Wash #1	11.0	—	11.0	10.0	—	10.0
Gallo Wash #2 <u>a/</u>	35.0	40.0	75.0	9.0	10.0	19.0
Bisti #6/8	1.0	—	1.0	1.0	—	1.0
Lee Ranch East	16.0	22.0	38.0	14.0	19.0	33.0
Lee Ranch Middle	86.0	154.0	240.0	73.0	131.0	204.0
Lee Ranch West	101.0	137.0	238.0	86.0	116.0	202.0
Divide	16.0	27.0	43.0	14.0	23.0	37.0
Hospah #1	22.0	196.0	218.0	19.0	167.0	186.0
Hospah #2 <u>a/</u>	10.0	49.0	59.0	5.0	25.0	30.0
Gamerco #1 (HC)	3.0	1.0	4.0	3.0	1.0	4.0
Bisti #4	36.0	1.0	37.0	30.0	1.0	31.0
Johnson Trading Post	17.0	2.0	19.0	14.0	2.0	16.0
Star Lake East #1	61.0	6.0	67.0	52.0	5.0	57.0
Bisti #1	150.0	—	150.0	127.0	—	127.0
Bisti #2	64.0	—	64.0	54.0	—	54.0
Catalpa Canyon	0.4	8.4	8.8	.3	7.1	7.4
Sundance	4.0	1.0	5.0	3.0	1.0	4.0
Samson Lake #2/2	11.0	14.0	25.0	9.0	12.0	21.0
La Plata #3	2.0	3.0	5.0	2.0	2.0	4.0
La Plata #4 <u>a/</u>	20.0	—	20.0	10.0	—	10.0
Star Lake East LC <u>a/</u>	64.0	—	64.0	21.0	—	21.0
Crownpoint NE	150.0	—	150.0	94.0	—	94.0
Crownpoint East (HC/LC)	149.0	6.0	155.0	124.0	5.0	129.0
Chico Wash South	74.0	6.0	80.0	63.0	8.0	71.0
Tah-ha-bah Well <u>a/</u>	23.0	—	23.0	12.0	—	12.0
Hogback	5.0	—	5.0	4.0	—	4.0
Twin Buttes	68.0	—	68.0	30.0	—	30.0
Pinehaven	7.0	—	7.0	6.0	—	6.0
Bread Springs #1	1.0	1.0	2.0	1.0	1.0	2.0
Bread Springs #2 <u>a/</u>	10.0	2.0	12.0	5.0	2.0	7.0
Gamerco #1 (LC)	2.3	1.3	3.6	1.9	1.2	3.1
Gamerco #2 LC) <u>a/</u>	17.0	19.0	36.0	8.0	9.0	17.0
Samson Lake #1 <u>a/</u>	26.0	0.0	26.0	13.0	—	13.0
TOTALS	1,942.7	830.7	2,773.4	1,093.2	577.3	1,668.5

Source: USDI, MMS Tract Delineation Reports, 1982.

Note: a/ Underground tracts



MAP 2-2 STRUCTURE MAP OF THE SAN JUAN BASIN, SHOWING CONTOURS ON THE BASE OF THE DAKOTA SANDSTONE. INTERVAL, 500 FEET. NUMBERS REPRESENT EXISTING OR PROJECTED ELEVATION ABOVE OR BELOW SEA LEVEL.

Source: Silver, 1950, and Fassett & Hinds, 1971.

Over the southern part of the basin, the Cretaceous strata dip one to two degrees. The strata are more steeply dipping on the flanks of the uplifts. In the arcuate Hogback Monocline, the strata dip up to 90 degrees and in some places on the east side are slightly overturned. Erosion of the upturned edge of the strata has resulted in prominent ridges of the more resistant sandstone beds.

Faulting of Cretaceous rocks is largely concentrated in the southeast part of the basin between the Zuni and Nacimiento Uplifts. Over most of the rest of the region, faults are relatively rare, discontinuous, have small displacements, and usually are 1.5 to 11 miles long. In the southeast part of the region, large faults from one to six miles apart are common.

Operating Coal Mines

Several coal mines and mine-mouth power generating stations are operating in the Fruitland Formation. A portion of the mines in the Crevasse Canyon and Menefee Formations are now abandoned.

The Mentmore Mine located west of Gallup produced 800,000 tons of coal in 1981, while the Burnham Mine located south of Shiprock produced approximately 800,000 tons of coal in 1981.

A small surface mine located southeast of Gallup, the Yellowhorse or Amcoal Mine (formerly the Sundance Mine), has been in production sporadically over the past few years. The production for this mine was 94,000 tons in 1980.

A large surface mine, the Pittsburgh-Midway Company's McKinley Mine, produced 4,568,154 tons of coal in 1980 from the lower Menefee and upper Crevasse Canyon Formations. It is located in New Mexico just east of Window Rock, Arizona.

In addition, in 1980 the Navajo and San Juan Mines just west of Farmington produced 7,733,000 tons and 4,538,000 tons respectively. The De-na-zin Mine southeast of Bisti produced 211,145 tons in 1981. All of these mines are surface operations (Martinez, 1981). The Gateway Mine bordering the Bisti WSA started initial production in 1983, and the Arroyo No. 1 mine near San Luis is also in limited production.

Coal Quality

Heating values for the Crevasse Canyon and Menefee Formation coals range from 8,000 to 12,000 BTUs per pound, whereas Fruitland Formation coals have a slightly lower range. In general, Fruitland coals have a higher ash content than the Crevasse Canyon and Menefee coals. Sulfur content for all the coals of the EIS Region is low, ranging from 0.5 percent to 1.5 percent, and averaging around 0.6 to 0.7 percent. The Mesa Verde Group coals range in rank from subbituminous B to high-volatile bituminous B (refer to the Glossary for a discussion of rank) with coals in the upper part of the basin being generally of higher rank. The Fruitland Formation coals range from subbituminous A to high-volatile bituminous C, with the northern Fruitland coals generally somewhat higher in rank.

PALEONTOLOGY

For convenience in discussion of this resource, the EIS Region is divided into two parts: the Southern Area, which contains rocks from the Triassic to the Upper Cretaceous period, and the Northern Area, which contains rocks from the Upper Cretaceous to the Cretaceous-Tertiary period boundary. Table 2-5 shows the separation of the proposed leasing tracts into these two areas. The general stratigraphic succession and fossils are illustrated in Figure 2-3.

There have been several detailed inventories completed in this area, one of which was conducted in the Lee Ranch mine area by LeMone, Harris, et al. in 1981. This study was conducted on state and private lands and no significant fossils were reported. However, the published literature and some subsequent inventories reveal a proliferation of potentially significant (in some cases) fossils on adjacent federal and Indian lands.

Southern Area

The stratigraphy of the Dakota-Mancos transition is reviewed by Dane et al. (1971), and Hook and Cobban (1979). Several units of the Mancos Shale are quite fossiliferous, yielding a diverse fauna of molluscs. The paleontology of these units is reviewed by Cobban (1977a). Additional discussion of the paleontology of the Dakota-Mancos transition can be found in Cobban (1977b), Landis et al. (1973), and Hook and Cobban (1977).

The Mancos is the thickest of the units exposed in the Southern Area, with a thickness of up to 2,300 feet in the eastern portions of the Southern Area. Thus, while the unit yields a diverse fauna, its density is relatively low. Fossils tend to be concentrated in particular horizons, such as concretions and siltstone interbeds. It is clear from the faunal lists derived from literature sources that intensive collecting from various horizons within the Mancos would result in a diverse and biostratigraphically valuable collection.

The Mesa Verde Group is subdivided into the following stratigraphic units (in ascending order): Gallup Sandstone, Crevasse Canyon Formation, Point Lookout Sandstone, and Menefee Formation. The Gallup Sandstone is a potentially significant fossiliferous unit that deserves more detailed study. A list of fossils reported from the Gallup Sandstone is reviewed in Flessa (1981). Most outcrops of this sandstone, while they may yield fossils, are not likely to produce collections significant enough for the complete protection of the exposure.





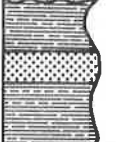
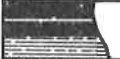



Fossils in the Crevasse Canyon Formation are rare and unstudied. Of the previously discovered localities within the Crevasse Canyon of the Southern Area (listed in Flessa 1981), only one is noteworthy. This site contains the first vertebrate material to be precisely noted from the Crevasse Canyon. The presence of coal units within the Crevasse Canyon and the known presence of plant fossils suggests that a concentrated paleobotanical survey would be likely to yield important plant fossils.

TABLE 2-5

SEPARATION OF PROPOSED COAL LEASING TRACTS INTO
AREAS FOR PALEONTOLOGY ANALYSIS

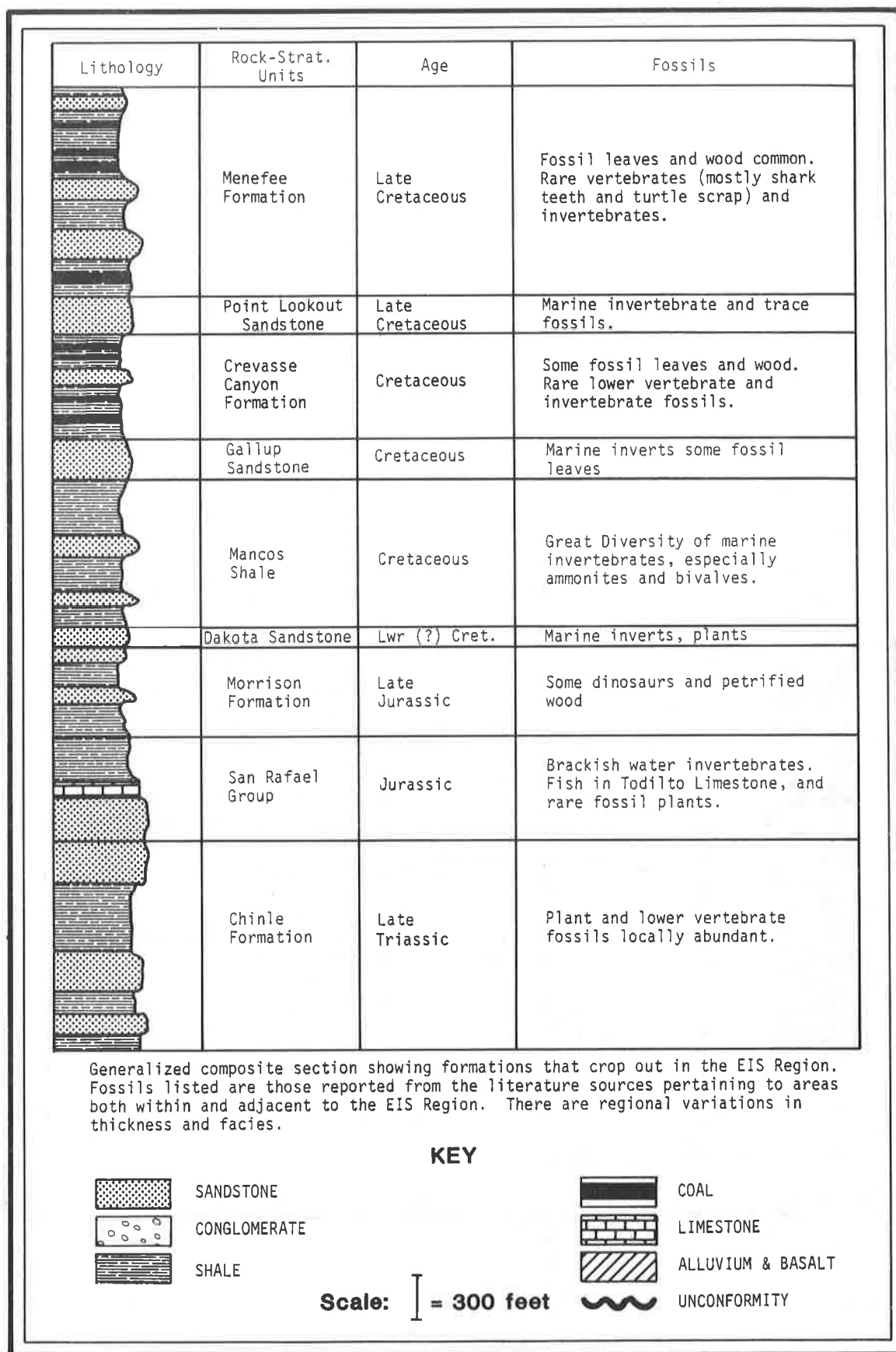
Northern Area	
<hr/>	
La Plata #1	Bisti #4
La Plata #2	Johnson Trading Post
Star Lake East #2	Star Lake East #1
Kimbeto #1	Bisti #1
Kimbeto #2	Bisti #2
Nageezi	La Plata #3
Gallo Wash #1	La Plata #4
Gallo Wash #2	Star Lake East (LC)
Bisti #6/8	
<hr/>	
Southern Area	
<hr/>	
Lee Ranch East	Crownpoint East (HC/LC)
Lee Ranch Middle	Chico Wash South
Lee Ranch West	Tah-ha-bah Well
Divide	Hogback
Hospah #1	Twin Buttes
Hospah #2	Pinehaven
Gamerco #1 (HC)	Bread Springs #1 and #2
Catalpa Canyon	Gamerco #1 (LC)
Sundance	Gamerco #2
Samson Lake #2/2	Samson Lake #1
Crownpoint Northeast	
<hr/>	

Figure 2-3. General Stratigraphic Section

Lithology	Rock-Strat. Units	Age	Fossils
	Alluvium	Quaternary	None reported
	San Jose Formation	Early Eocene	Diverse vertebrate faunas of primitive mammals, turtles, crocodiles, fish, lizards, snakes, and a bird. Some fresh water gastropods and unionids. Rare fossil leaves and some petrified wood.
	Nacimiento Formation	Early to Middle Paleocene	Diverse vertebrate faunas of mammals, etc. Some fresh water invertebrates, wood and leaves.
	Ojo Alamo Sandstone	Earliest Paleocene	Rare fossil mammals. Much petrified wood.
	Kirtland Shale	Late Cretaceous	Dinosaurs, turtles, crocodiles, and other vertebrates. Leaves and wood locally abundant. Some fresh water invertebrates.
	Fruitland Formation	Late Cretaceous	Similar to Kirtland some brackish water inverts much fossil wood.
	Pictured Cliffs Sandstone	Late Cretaceous	Marine invertebrates and trace fossils.
	Lewis Shale	Late Cretaceous	Bivalves, ammonites, and other marine invertebrates, one mosasaur.
	Cliff House Sandstone	Late Cretaceous	Marine invertebrates and trace fossils, sharks teeth.

(continued on next page)

(Figure 2-3 continued)



Little detailed stratigraphic and no detailed paleontological work on the Menefee Formation have been done within the Southern Area. In areas previously studied, plant fragments are the most commonly reported fossil material. An evaluation of the potential paleontological significance of the Menefee is extremely difficult because so little is known about it. A previous survey (Kues et al., 1977) suggests that the Menefee may yield significant paleobotanical material upon close inspection.

Northern Area

Late Cretaceous formations in this area fall into three general environments: off-shore marine deposits (mainly shale, minor sandstones and limestones); regressive and transgressive shoreline deposits (usually sandstones); and continental sediments (generally shales and sandstones representing stream or swamp environments and containing more organic material, notably coal). By far the largest part of the Northern Area contains exposures of the Late Cretaceous Kirtland/Fruitland Formation. Older off-shore marine and shoreline deposits all contain marine invertebrate faunas of varying diversity, mostly molluscan. Other discussion can be found in the BLM's Chaco-San Juan Planning Unit Resource Analysis -- Update for Coal (USDI, BLM 1980b). A review of the flora and fauna of the Late Cretaceous is given in Kues et al. (1977), and Lucas, Rigby and Kues, eds. (1981).

The Kirtland/Fruitland Formation has received special attention because of its vertebrate faunas. This formation and the Nacimiento contain an almost unparalleled record of one of the most important episodes in the history of life -- the abrupt change from domination of terrestrial communities by dinosaurs to domination by mammals.

SOILS

Soils for the 39 tracts are represented by 3 groups and 13 associations, with small occurrences of other soils (refer to Table 2-6). These soils are derived from alluvial, eolian, and residuum sandstone and shale. They are found on uplands, mesas, benches, hillsides, fans, valley sideslopes, and valley bottoms. Soil textures are represented by sands, loams, and clays. Soil depths run from shallow (+15 inches) to deep (+40 inches), and soil colors range from browns to grays. Permeability is slow to rapid, with runoff high to low. Some of the soil associations have inclusions of soils with gravelly substrata, alkali-affected areas, rocklands, and badlands. A general description of the 13 soil association is as follows:

Soil Associations 1, 4, 6, and 8 through 13 on Table 2-6 have inclusions of badland area soils. These badland soils are shallow and poorly developed, and are considered to be unsuitable as a source of planting media by themselves. Sparse vegetation and barren areas are found on these soils, with natural fertility and organic matter very low. Soil textures are generally clays; restricted permeability, high salinity, severe erosion hazards, and excessive slopes are characteristic. Rough topography and deep drainage channels can be found in these areas.

TABLE 2-6
SOILS INTERPRETATION SUMMARY

Soil Association	Depth (Inches)	Runoff Rate	Erosion/Hazard	Color	Permeability	Texture/Surface	Origin	Percent of Association
1. Hagerman-Travessilla	12-40	Medium	Moderate-High	Browns	Moderate-Rapid	Fine sandy loam-silty clay loam	Residually weathered sandstone and shale	Hagerman (35%)-Travessilla (20%)
2. Las Lucas-Little-Persayo	10-60	Medium-Rapid	Moderate-High	Gray	Slow-Moderate	Loam-silty clay loam	Shale bedrock or alluvium	Las Lucas (30%)-Little (25%)-Persayo (25%)
3. Shiprock-Sheppard-Doak	40-60	Slow-Medium	Moderate-High	Browns	Moderate-Rapid	Fine sandy loam-loam	Alluvial & eolian sandstone & shale	Shiprock (28%)-Sheppard (23%)-Doak (23%)
4. Blancot-Notal	60	Medium	Moderate-High	Browns	Slow-Moderate	Loam-silty clay loam	Sandstone & shale alluvium	Blancot (55%)-Notal (25%)
5. Sheppard-Huerfano-Notal	15-60	Medium	Moderate	Browns	Moderate-Rapid	Loamy fine sand-silty clay loam	Eolian, alluvial, residuum sand stone, shale, & siltstone	Sheppard (25%)-Huerfano (13%)
6. Badland-Rock Outcrop-Monierco	+13	Medium-Rapid	Moderate-High	Brown-Grays	Slow-Rapid	Fine sandy loam-barren shale & sandstone	Eolian & alluvial material	Badlands (74%)-Rock Outcrop (15%)-Monierco (8%)
7. Persayo-Lohmiller	10-60	Medium-Rapid	Moderate-High	Grays-Browns	Slow-Moderate	Fine sand-clay	Residual sandstone & shale, eolian sands & alluvial & sandstone	Persayo (35%)-Lohmiller (30%)
8. Penistaja-Sheppard-Rockland	+60	Slow-Medium	Moderate-High	Browns	Moderate-Rapid	Loamy fine sand-clay loam	Eolian & alluvial shale stone & shale	Penistaja (35%)-Sheppard (20%)-Rockland (25%)
9. Penistaja-Sheppard	+60	Slow-Medium	Moderate-High	Browns	Moderate-Rapid	Loamy sand-light clay loam	Eolian & alluvial sand-sandstone & shale	Penistaja (55%)-Sheppard (25%)
10. Travessilla-Persayo-Rockland	10-20	Medium-Rapid	Moderate-High	Browns-Grays	Slow-Moderate	Fine sandy loam-silty clay loam	Residually weathered sand & shale	Travessilla (30%)-Persayo (25%)-Rockland (25%)
11. Penistaja-Sheppard-Palma	+60	Slow-Medium	Moderate-High	Browns	Moderate-Rapid	Loamy sand-light clay loam	Eolian & alluvial deposits & residuum sandstone & shale	Penistaja (35%)-Sheppard (20%)-Palma (20%)
12. Thurloni-Savonia-Concho	20-60	Medium	Moderate	Browns-Grays	Moderate	Fine sand-clay	Eolian sands, alluvial	Thurloni (30%)-Savonia (20%)-Concho (12%)
13. Penistaja-Lohmiller-Travessilla	10-60	Medium	Moderate	Browns	Moderate-Rapid	Fine sand-clay	Eolian sands, alluvial & residuum sandstone & shale	Penistaja (35%)-Lohmiller (30%)-Travessilla (25%)

Inclusions of rockland area soils are found within Soil Associations 1, 2, 4 and 6 through 13 (Table 2-6). These rockland soils are highly variable, having textures ranging from sands to sandy loams. They are generally shallow and poorly developed. Considered unsuitable as planting media, these soils have very low natural fertility and organic matter, and erosion occasions from wind and water is high. The percentage of occurrence of rockland areas within the proposed lease tracts runs from 3 to 27 percent.

Some soils found in valley areas are considered unsuitable for planting media by themselves; organic matter and natural fertility is very low. (Refer to Soil Associations 6 through 9 and 11 through 13 in Table 2-6.) These are saline-sodic soils with scattered sparse vegetation and barren areas. Found on nearly level or very gently sloping areas, these soils have developed from streamflow deposits, except for very shallow sandy windblown material in scattered areas. Textures usually range from loamy sand to clay. Permeability varies, but where a high amount of sodium occurs, moisture penetration is very restricted or eliminated. Sodium levels are sometimes high in both surface and sub-soils, ranging from 15 to 50 percent of the exchange capacity (refer to the Glossary).

Soils found within active dunes are considered unsuitable for planting media. These areas consist of undulating ridges and small hills. Soils are generally barren and subject to severe wind erosion, with a very low natural fertility level and an organic matter content of nearly zero. Textures are usually fine sand and sand. These soils have excessive permeability resulting in low water-holding capacity and little water availability for plant growth.

Soils found in stream and drainage channels are considered unsuitable for planting media by themselves. These soils are composed of deposits associated with major drainage systems. Natural fertility level is very low, and water-holding capacity is very poor. Textures are usually sandy with deposits of gravel and cobble. These soils are subject to severe wind erosion and are usually barren.

Coarse-textured soils (sands) have reclamation limitations. Natural fertility level is very low and organic matter content is nearly zero. Soils depths range from 13 to 60 inches, with texture from sand to loamy sand. These soils have high permeability rates, resulting in low water-holding capacity. Plant growth is mainly dependent on precipitation because available water within the plant's root zone is limited. The lack of plant growth results in active wind erosion.

Fine-textured soils (silts & clays) also have reclamation limitations. Natural fertility and organic matter is very low. Soil depths range from 10 to more than 40 inches, and textures range from silty clay loam to clays. These soils have high runoff rates resulting in low water intake. Water found in fine-textured soils is often near the surface and lost to plant growth because of evaporation. Wind erosion is high for these soils.

Soil data regarding reclamation was taken from the sources cited above, and the BLM's Energy Mineral Rehabilitation Inventory and Analysis (EMRIA) reports dating from 1976 through 1981.

Soil data for the 39 tracts was taken from the Soil Survey of San Juan County, New Mexico, Eastern Part (USDA, SCS BIA, BR and NM Agricultural

WATER RESOURCES

The State Engineer requires protection or replacement of existing surface or groundwater uses. New Mexico Surface Coal Mining Regulations Rule 80-1, Section 20-54 require compliance with any water-replacement plan approved by the State Engineer. Other regulatory requirements such as the protection of the hydrologic balance (Section 9-21 of Rule 80-1) are administered and enforced by the Mining and Minerals Division of the New Mexico Energy and Minerals Department.

Surface Water

Data about surface water on the individual coal tracts do not exist; however, site-specific information is required as part of the mining and reclamation plan that the applicant submits to the Office of Surface Mining and the New Mexico Coal Surface Mining Commission. The following section is a general description of surface water in the EIS Region.

The EIS Region lies within both the Rio Grande and Colorado River drainage basins. The coal tracts east of the Continental Divide (Rio Grande basin) drain to Arroyo Chico. Most of the tracts lie west of the Divide in the Colorado River basin. The La Plata tracts and those in the Chaco River basin drain to the San Juan River. The tracts near Gallup are in the Puerco River watershed, except for the small part of the Pinehaven tract that is in the Zuni River drainage. The location of the coal tracts in relation to the major drainage basins is shown in Figure 2-4.

Surface Water Quantity

The limited quantity and erratic temporal and spacial distribution of precipitation causes streamflow to be extremely variable. Approximately one half of the annual precipitation occurs from July through October, generally in the form of localized, short-duration, high-intensity thunderstorms. These storms may create large flows, which are commonly of limited duration and areal extent. Winter precipitation produces longer, lower volume flows. Precipitation is summarized in Appendix Figure B-1.

The San Juan and the Animas Rivers are the only perennial streams in the area; both derive much of their flow from snowmelt in the San Juan Mountains in Colorado. The reaches of Arroyo Chico and the Puerco River have flow caused by uranium-mine dewatering and the Chaco River near Waterflow generally has flow because of powerplant wastewater effluent. All other streams in the area are either ephemeral (that is, flowing only in direct response to precipitation) or intermittent (flowing only at certain times of the year).

Daily streamflow for the 1981 water year for gaging stations on the Chaco River near Burnham and on Arroyo Chico near Guadalupe is shown in Figure 2-5. The variability in day-to-day flow and the sharp increases in flow caused by precipitation are typical of streams in the EIS Region.

Graphs of average monthly streamflow (Figure 2-6) are also indicative of the variability of streamflow. The La Plata River graph clearly demonstrates the increase in flow in spring and early summer caused by snowmelt in the headwaters of the stream in Colorado. In contrast, the greatest average monthly flows in Arroyo Chico are caused by rainfall from July through October. The graphs of streams in the Chaco River basin are based on a much shorter period of measurement and may reflect greater than normal winter precipitation in recent years. Graphs based on additional future measurements are expected to more closely approximate the Arroyo Chico graph.

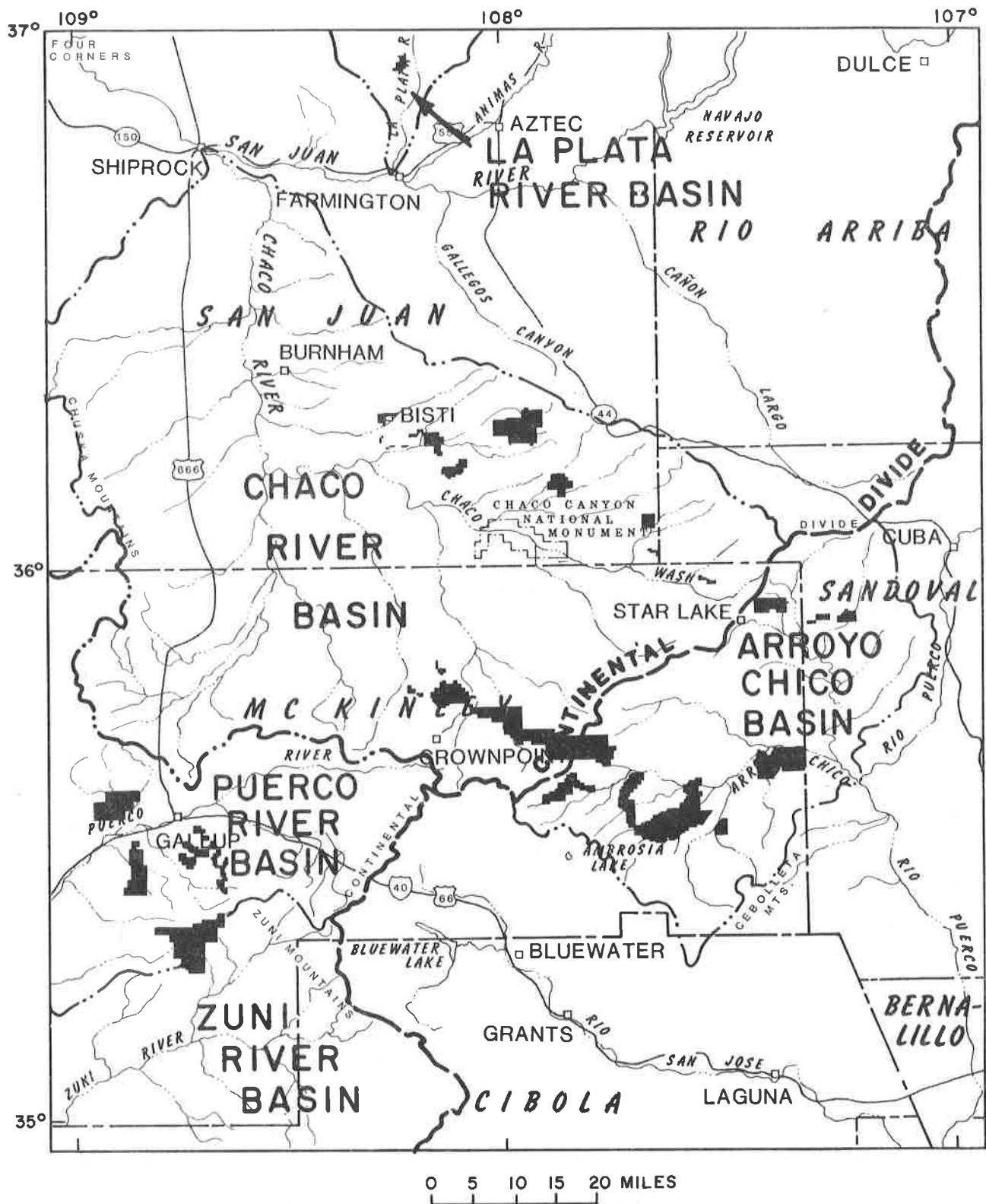
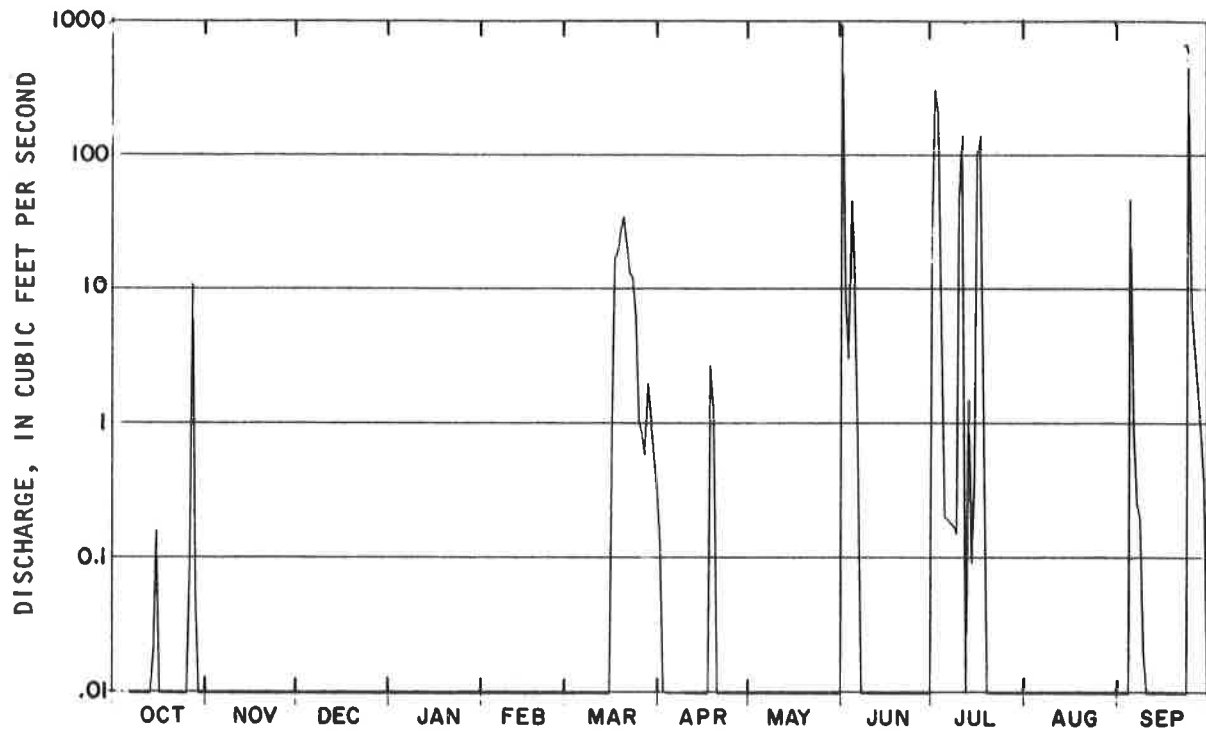
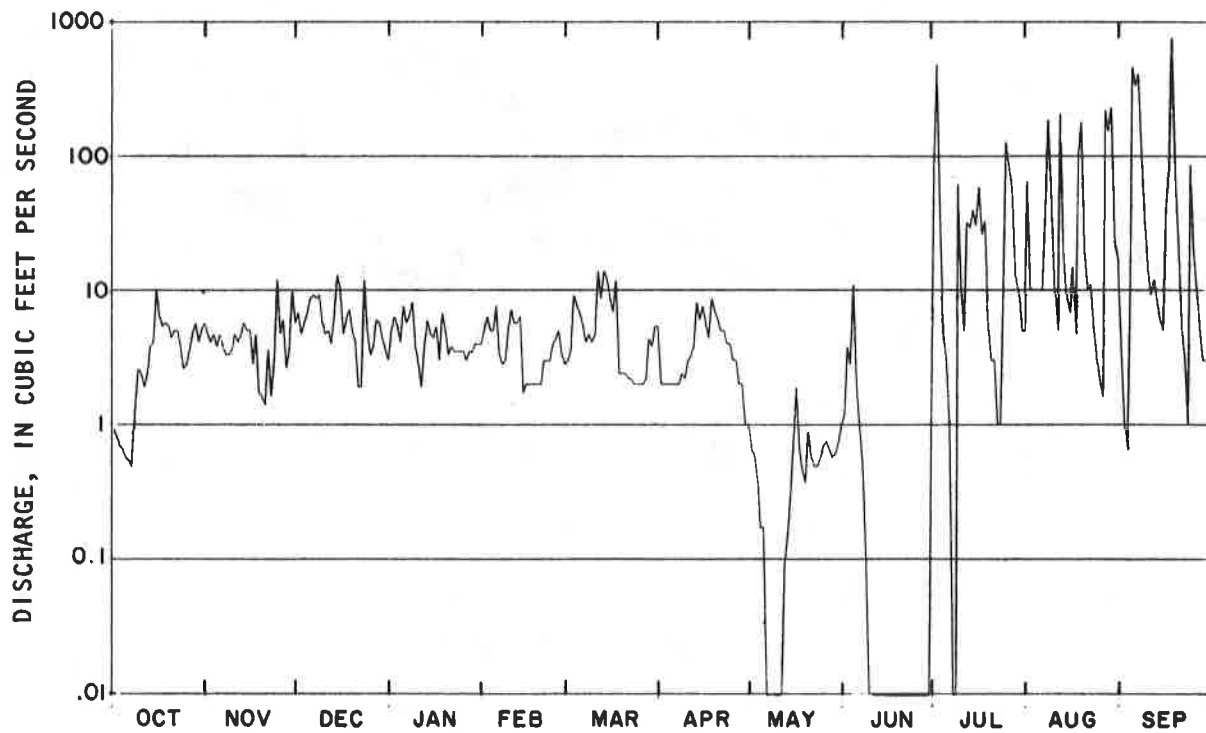


Figure 2-4 Location of coal tracts in relation to major drainage basins.



09367938 Chaco River near Burnham, New Mexico



98340500 Arroyo Chico near Guadalupe, New Mexico

Figure 2-5 Daily streamflow at selected gaging stations, 1981 water year.

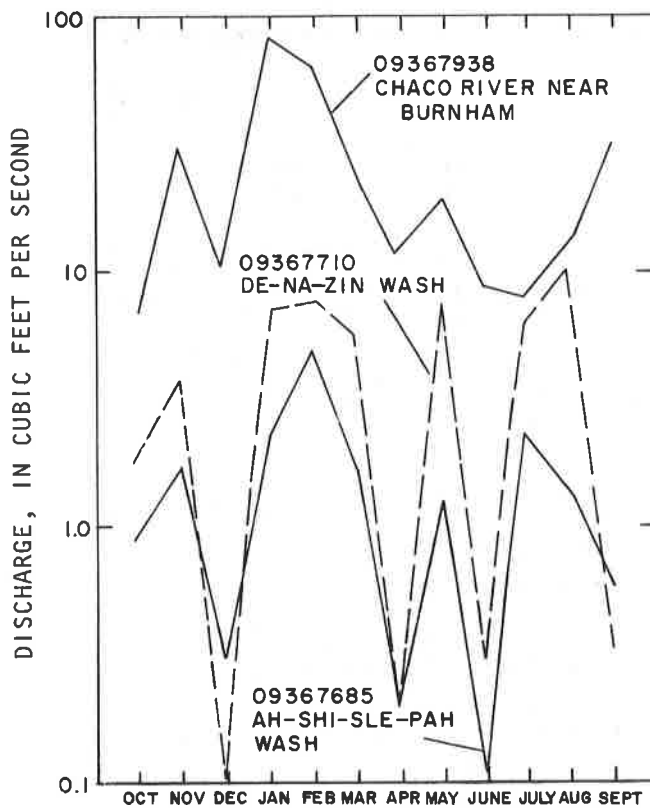
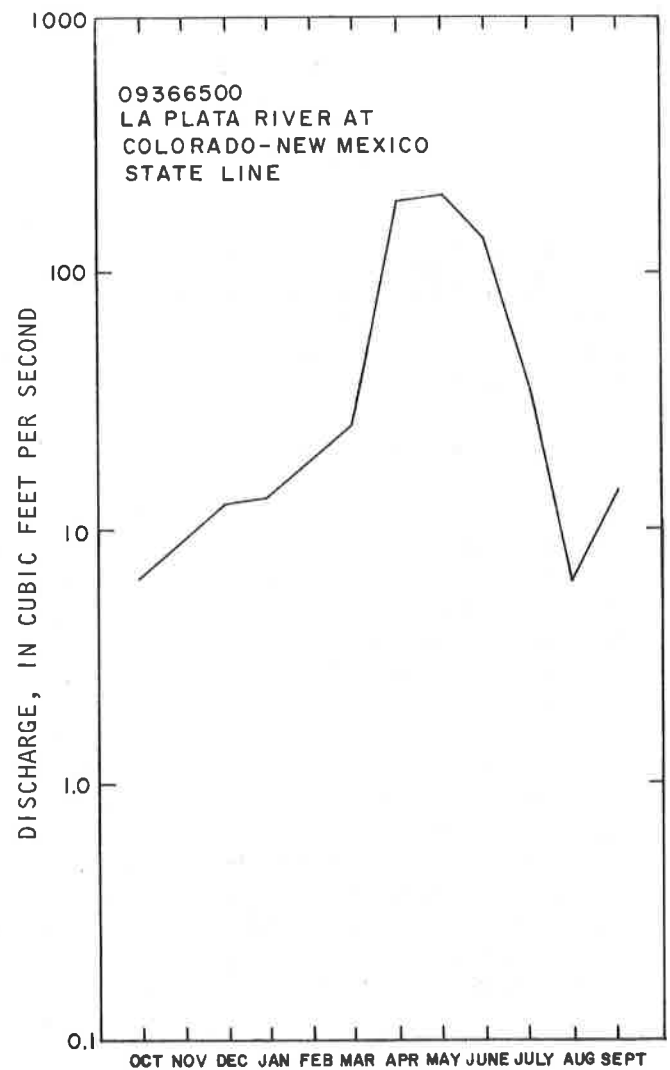
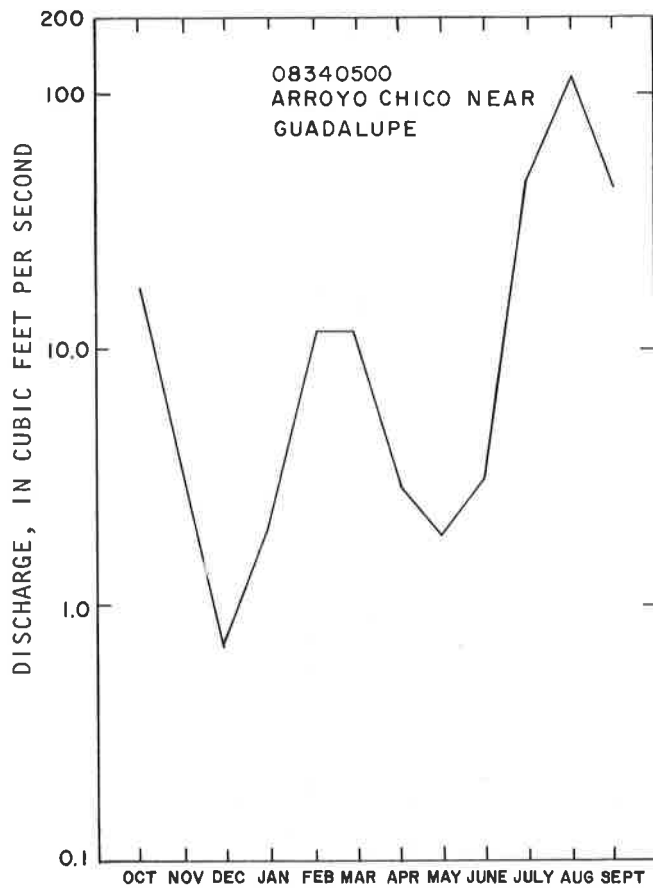


Figure 2-6

Average monthly streamflow at selected gaging stations.

The limited quantity and variable nature of streamflow make surface water an unreliable source of supply for mining operations. The flow-duration curves in Appendix Figure B-2 and Appendix Figures F-1 through F-7 in the Draft Environmental Assessment for Coal Preference Right Leasing, New Mexico (USDI, BLM, 1981a) also indicate the undependable supply of surface water in the area. After precipitation, playa lakes and dirt stock tanks in the area provide a limited, temporary supply of surface water, though not of sufficient quantity for mining operations.

Information about average annual discharge, contributing drainage area, and estimated flood magnitudes for various recurrence intervals for selected sites in the EIS Region are presented in Appendix Figure B-3 and Table B-4. Additional data about these and other sites in the area are reported in Water Resources Data for New Mexico published annually by the U.S. Geological Survey. Hejl (1982) summarizes current U.S. Geological Survey hydrologic investigations and data collection related to coal mining in the EIS Region. Further information about more specific areas have been reported in EMRIA Reports - Kimbeto, Bisti, Star Lake, and Ojo Encino (USDI, BLM 1976-80b), in the Draft Environmental Assessment for Coal Preference Right Leasing, New Mexico (USDI, BLM 1981a) and by Shown and others (1981).

Surface Water Use

Legal constraints are placed on the use of surface water in the region. Surface water is under the jurisdiction of the New Mexico State Engineer. At present, all surface water is fully appropriated.

The major uses of surface water on a regional basis are described in the Star Lake-Bisti Regional Coal Final Environmental Statement (USDI, BLM 1979c). Data about the use of surface water for community supplies is summarized on Table 2-16 of this report. The supply of surface water is unreliable in the coal tract areas. Temporary pools that form at dirt tanks and playa lakes provide water for livestock and wildlife.

Surface Water Quality

The only long-term water-quality data available in the EIS Region is for the San Juan River; water quality has been sampled on all other streams in the area for fewer than ten years. The location and period of record of selected water-quality gaging stations are shown in Appendix Figure B-5. Results of major chemical and trace-element analyses of streamflow at these stations are summarized in Appendix Tables B-6 and B-7.

The quality of surface water is highly variable both from stream to stream and even in the same stream. In comparison to other streams in the area, the concentrations of most dissolved constituents in water are low in the San Juan and the Zuni Rivers and in Papers, Gallo, and Teec-ni-di-tso Washes. Greater than average concentrations of many constituents are present in Shumway Arroyo near Waterflow, the La Plata River, Kim-me-ni-oli Wash, and Arroyo Chico. The data for Arroyo Chico in Appendix Table B-6 are from only one sample and may not be typical of the chemical quality in the drainage as a whole. The concentrations may reflect the effects of the uranium-mine dewatering that provides much of the base flow. The surficial deposits in the Arroyo Chico drainage are similar to those in the Chaco drainage; thus, the quality of natural streamflow in the area is expected to be similar to that of the Chaco. The water quality

of streams changes in the downstream direction. Water samples of the Chaco River taken at Star Lake and at Chaco Canyon generally have lower concentrations of most constituents than the samples collected downstream near Burnham. The San Juan River has lower concentrations of all major constituents at Farmington than at Shiprock. Samples from two sites on Shumway Arroyo demonstrate similar changes.

The concentrations of major chemical constituents (Appendix Table B-6) in water in all streams except Shumway Arroyo near Waterflow, Arroyo Chico, and Kim-me-ni-oli Wash are within the recommended levels for use as water supplies for livestock and irrigation. Only the San Juan and Zuni Rivers and Papers and Teec-ni-di-tso Washes have water that is within recommended levels of major chemical and trace-element concentrations listed in Appendix Tables B-6 and B-7 for public-supply use. Recommended water-quality criteria for various uses have been published many times, recently in Appendicies F-9 through F-11 in the Draft Environmental Assessment for Coal Preference Right Leasing, New Mexico (USDI, BLM 1981a).

In addition to the concentrations of dissolved chemical constituents present, a major factor in the overall surface-water quality in the EIS Region is the extremely high concentration of suspended sediment in most surface flows. The majority of the sediment is very fine clay and silt (0.0625 millimeters or less in diameter), which are very slow to settle. The adsorption of trace elements on these sediments commonly causes the "total" concentration of most trace elements to be significantly greater than the dissolved concentration, especially during large volume streamflows. In general, the greater the amount of badland and rockland soil areas and incised channels in a drainage, the greater the sediment yield.

Estimates of naturally occurring sediment yields for the acreages to be disturbed by mining operations are shown in Appendix Table B-8 for the PRLA tracts and in Table B-9 for the EIS coal tracts.

Water in playa lakes or dirt tanks near the coal tracts generally is of poorer chemical quality than that of streamflows. The limited available data indicate that the rate of water loss caused by evaporation may exceed that caused by infiltration, thus causing the concentration of dissolved constituents to increase.

A general description of the surface-water quality in the EIS Region is summarized in the Star Lake-Bisti Regional Coal Final Environmental Statement (USDI, BLM 1979c). The EMRIA Reports (USDI, BLM 1976-80) give water-quality information about specific areas. Shown and others (1981) and Summer (1981) present very detailed descriptions about sediment yield for small drainages in the area. Soils in Chapter 2 and Table 2-6 in this report summarize the relative erosion rate of the soils present in the EIS Region.

Ground Water

The EIS Region coincides approximately with the San Juan Structural Basin as defined by Kelley (1951). This basin is larger than either the San Juan River Basin or the San Juan Underground Water Basin declared by the New Mexico State Engineer (refer to Figure 2-7).

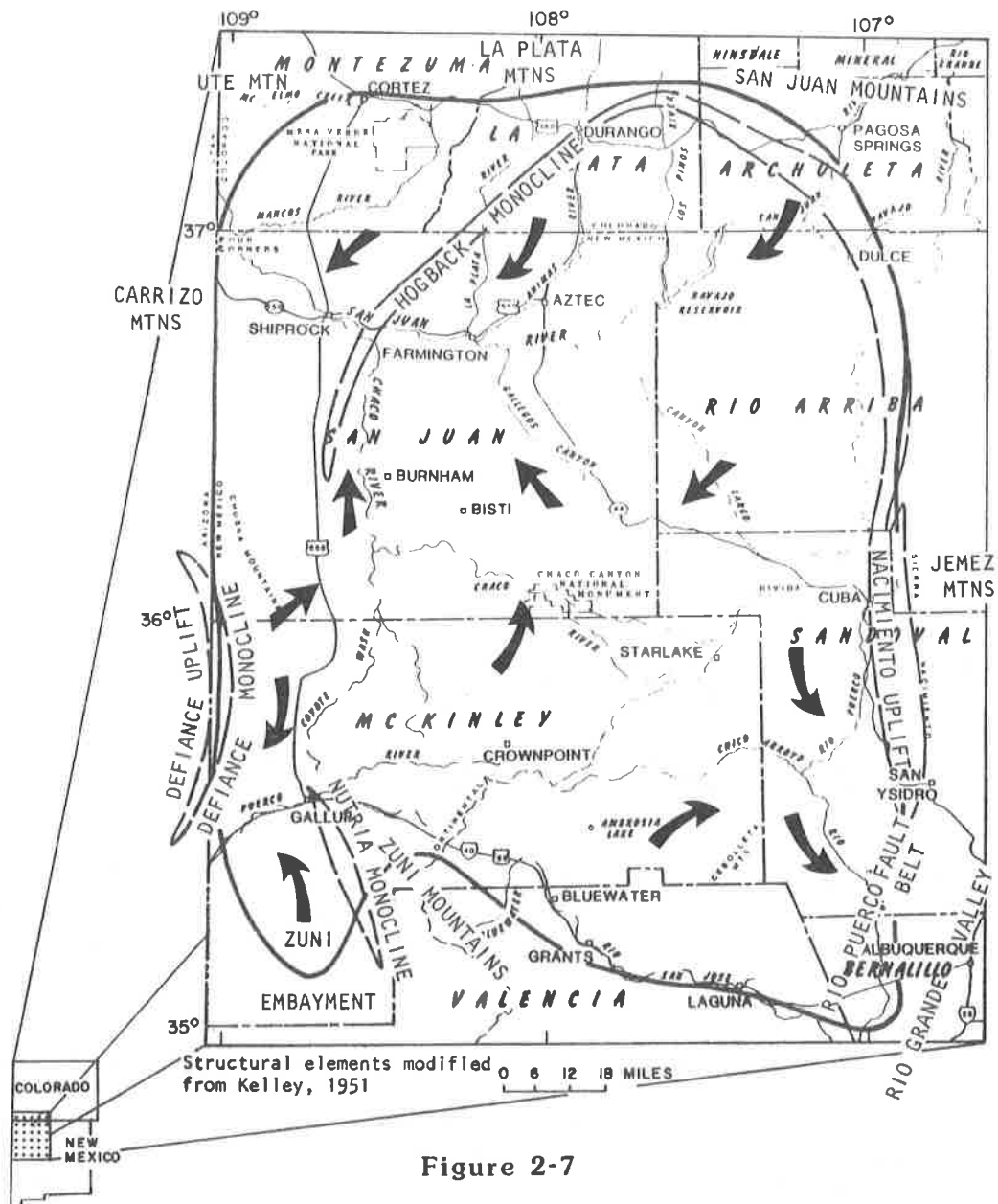


Figure 2-7

STRUCTURAL ELEMENTS OF THE SAN JUAN BASIN LOCATION OF THE EIS AREA, AND GENERALIZED DIRECTIONS OF GROUND-WATER MOVEMENT (INDICATED BY ARROWS)

Source: Modified from Lyford, 1979.

Generally the bedrock aquifers crop out on the topographically and structurally higher margins of the basin and dip underground towards the central, lowest part of the basin (refer to Figure 2-8). Alluvium (valley fill deposits) occurs in most of the stream channels of the basin.

Most recharge to the aquifers generally takes place on their outcrop areas by infiltration of precipitation and runoff. Water in bedrock aquifers flows from recharge areas (where it occurs under water-table conditions) generally downdip towards the basin center (where it occurs under artesian conditions). Movement of ground water between aquifers may occur via numerous faults that exist throughout the basin. Water in alluvium flows downslope in the same direction as streamflow.

Natural discharge of ground water from San Juan Structural Basin aquifers generally occurs as the water moves towards the Four Corners region and the Rio Grande Valley. Some ground water moves southwest towards the Puerco River near Gallup (refer to Figure 2-7). Lyford (1979) provided an excellent general description of San Juan Basin ground water hydrology. Stone, et al. (in press) present detailed information about this hydrology.

Wells can be used to supply water for stock use in most of the San Juan Structural Basin, but yields are frequently small and water quality is commonly marginal. At least 20 bedrock geologic units are known to yield water to wells.

Ground Water Quality

The quality of ground water in the EIS Region generally ranges from fresh to moderately saline (classification of Swenson and Baldwin, 1965). In many areas of the San Juan Structural Basin, the total-dissolved-solids concentration exceeds the Environmental Protection Agency's recommended limit of 1,000 milligrams per liter (mg/l) for potable water (EPA 1972).

The quality of water in bedrock aquifers is commonly best near the outcrop, or recharge, areas of those aquifers. Water quality tends to decrease with distance from outcrops because the water dissolves minerals in the rocks as it flows through them. These water quality trends have been shown by Lyford (1979) and Craig (1980).

The quality of water in the alluvium is generally better than that from bedrock aquifers. Total dissolved solid concentrations range from less than 1,000 mg/l in headwater areas to more than 2,000 mg/l in downstream reaches (Lyford, 1979). Table 2-8 summarizes water-quality data for major aquifers in the San Juan Structural Basin.

Aquifers Associated with EIS Region Coal Tracts

The tracts are located in three hydrostratigraphically distinct areas of the San Juan Structural Basin. These three areas coincide with the outcrops of the three main coal-bearing geologic units in the basin. These units are the Fruitland Formation coal trend (Star Lake-Bisti regions), Menefee Formation coal trend (Torreon-Arroyo Chico-Lee Ranch regions), and the Menefee-Crevasse Canyon Formation coal trend (Crownpoint-Gallup regions). Different aquifer combinations underlie each of these areas. Shomaker and Stone (1976) identified major and minor potential aquifers associated with these three regions.

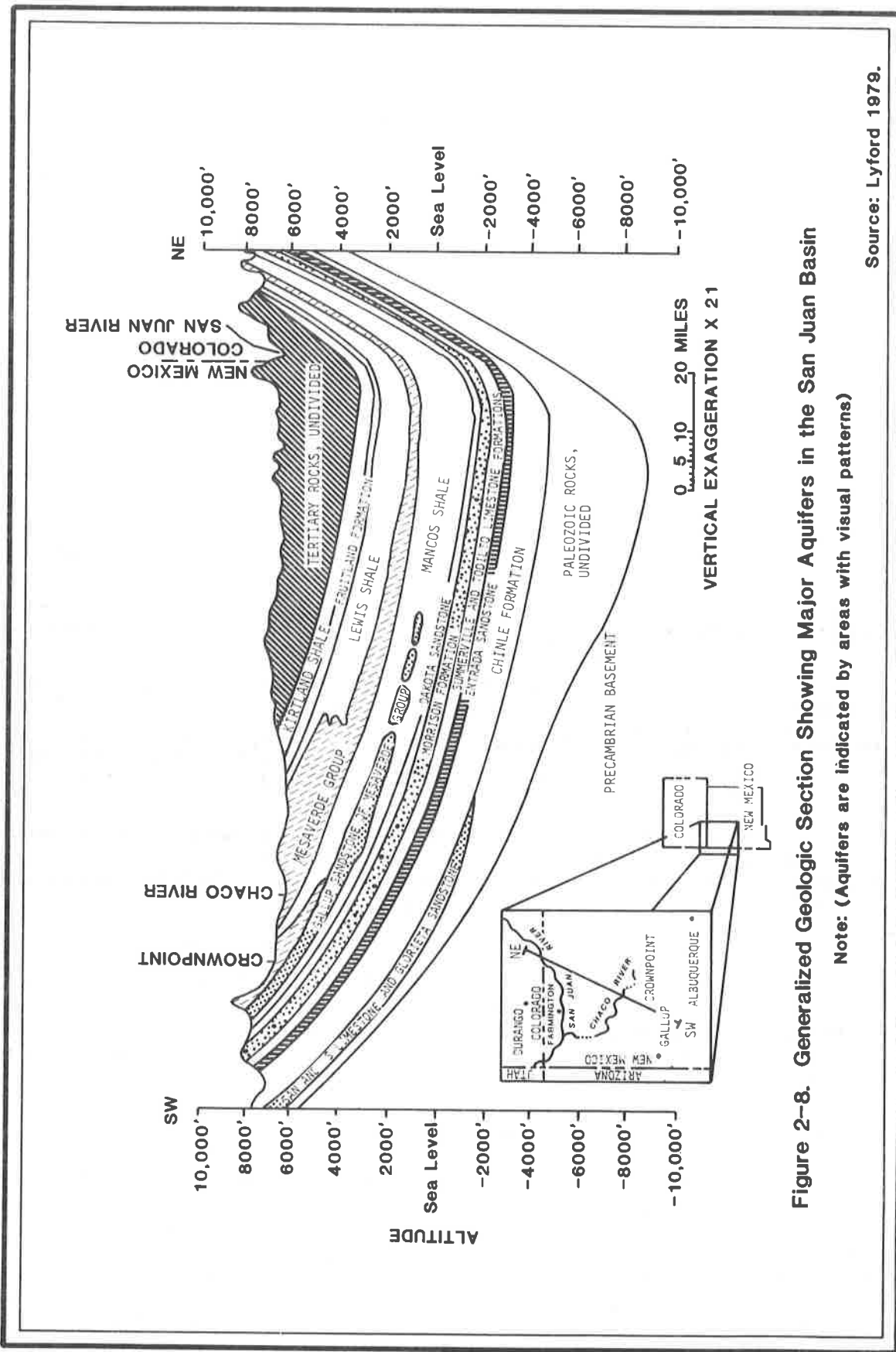


TABLE 2-7
HYDROGEOLOGIC CHARACTERISTICS
OF MAJOR AQUIFERS IN THE SAN JUAN BASIN

Aquifer	Formation Thickness (ft)	Transmissivity ^{a/} (ft ² /day)	Specific Capacity ^{a/} (gal/min/ft)
Alluvium	0-100	>40,000 (Along San Juan, La Plata, and Animas Rivers)	
		<1,000 (Along ephemeral streams)	
San Jose Formation	0-3,000	150+	
Nacimiento Formation	800-2,000		
Ojo Alamo Sandstone	0-400	57-165	0.2-1.02
Fruitland Formation	0-500		
Pictured Cliffs Sandstone	75-375		0.02-0.07
Cliff House Sandstone		<50-100	0.05-0.12
Menefee Formation	100-2,000	25-50	0.03-1.38
Point Lookout Sandstone	75-350	<50-100	0.07-1.12
Crevasse Canyon Formation	100-1,000	<50-100	0.03-0.64
Gallup Sandstone	0-500	<100-270	0.03-4.7
Dakota Sandstone	0-250		0.05-0.2
Westwater Canyon Member of Morrison Formation	50-400	36-510	0.27-1.6
Entrada Sandstone	50-400	<50-300	0.02-3.5

Source: USDI, BIA 1980; USDI, BLM 1979; Lyford 1979; Woodward-Clyde 1982; Craig 1980.

Note: ^{a/} Refer to Glossary for a definition of these terms.

Major potential aquifers underlying the Fruitland coal trend are the Gallup Sandstone (of Cretaceous age), west of R. 11 W. the Westwater Canyon Member of the Morrison Formation, and the Entrada Sandstone (both Jurassic). Minor potential aquifers are the Pictured Cliffs, Cliff House, Point Lookout, and Dakota Sandstones (all Cretaceous).

Major potential aquifers in the Menefee-Crevasse Canyon coal trend (Shomaker and Stone, 1976) are the Dalton Sandstone Member of the Crevasse Canyon Formation, "Stray" sandstone, Gallup Sandstone (all Cretaceous), and the Westwater Canyon Member of the Morrison Formation (Jurassic). One minor potential aquifer is the Dakota Sandstone (Cretaceous). The Point Lookout Sandstone (Cretaceous) should also be considered as a minor potential aquifer for this coal trend.

The coal-bearing formations themselves are also important aquifers locally. The Ojo Alamo Sandstone, Nacimiento Formation, and the San Jose Formation are potential aquifers, especially along the Fruitland Formation coal trend. Quaternary alluvium is an important local aquifer in all the EIS Region. Hydrogeologic characteristics and water-quality data for these aquifers are summarized in Tables 2-7 and 2-8.

Ground Water Use

Ground water in the EIS Region is withdrawn for various purposes, the most predominant of which include uranium mine dewatering (mostly from the Westwater Canyon Member of the Morrison Formation), milling of ore, various industrial activities, municipal supplies, rural domestic needs, and livestock watering.

Legal constraints are placed on the use of ground water in the region. Use is administered by the New Mexico State Engineer, who has declared four Underground Water Basins within the San Juan Structural Basin. These are the San Juan, Bluewater, Gallup, and Rio Grande Underground Water Basins. Once an area has been designated as an Underground Water Basin, permits must be obtained from the State Engineer before ground water may be appropriated. Permits are issued only after public notice and are subject to protest by parties holding prior existing water rights.

Floodplains

The Federal Insurance Administration (FIA) has mapped the floodplains associated with each major drainageway in the EIS Region. Table B-1 in Appendix B summarizes approximate floodplain acreages for these drainageways, based on the FIA's Flood Hazard Boundary Maps. Floodplain acreages are approximate and were calculated only for those tracts identified as surface-mineable by the Minerals Management Service. For maps showing the areal distribution of floodplains within each surface-mineable tract, the reader is referred to file material in the BLM Farmington Resource Area Office.

Development in floodplains is uncommon, but usually consists of fencelines or shallow wells completed in alluvium. Single-family dwellings may exist in some floodplain areas.

TABLE 2-8
PHYSICAL PROPERTIES AND CHEMICAL QUALITY
OF MAJOR AQUIFERS IN THE SAN JUAN BASIN ^{a/}

Aquifer	Silica (SiO ₂)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium & Po- tassium (Na+K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Dissolved Solids	Total Hard- ness (Units)	pH	Temperature (°C)
Alluvium	4.1-63	0-6.6	4-2,870	0.8-2,040	5.5-12,000	34-1,000	2.5-8,890	2-27,500	0-11	0-439	143-47,100	18-15,500	7.3-8.3	4-21
San Jose Formation	7.6-28	0.02-14	1.6-365	0-67	29-745	120-814	71-1,430	3-2-87	0.2-4.0	0-25	323-2,520	4-1,960	6.5-9.2	9-14
Nacimiento Formation	14-22	0.02-0.58	0-385	0-50	3-2,415	0-478	6.2-5,455	1-145	0-4	0.2-5.7	56-14,150	30-966	6.9	12
Ojo Alamo Sandstone	9.6-39	0-2.1	1.6-548	0-126	23-788	0-888	0.4-2,440	0.8-923	0.3-1.8	0-70	275-4,010	4-1,860	6.5-8.9	2-14
Pictured Cliffs Sandstone	11-20	0-0.24	1.9-425	1-217	50-16,600	209-2,400	7.3-4,400	19-26,600	1.2-5.5	0-8.6	383-44,200	11-1,950	7.4-9.1	3-19
Ciff House Sandstone	2.7-19	0-0.01	2.2-280	0.7-170	26-6,140	0-1,250	350-8,230	7-4,210	0-8.1	0.1-2.5	849-3,120	8-1,600	4.3-8.9	13-18
Manatee Formation	5.1-21	0-1.1	1-168	0-34	8-2,620	92-1,890	1.8-3,930	1.5-956	0-12	0-19	129-7,780	4-534	7.4-9.1	12-21
Point Lookout Sandstone	0.05-39	0-0.31	0-684	0.4-267	13-833	116-826	3.8-3,410	2.2-113	0.2-3.7	0.1-14	149-5,080	5-2,800	7.4-10.0	13-21
Crevasse Canyon Formation	5.5-24	0-3.6	1.3-630	0-245	0.9-1,002	122-1,030	9.2-2,980	1.4-94	0-2.0	0-427	243-4,470	4-3,100	6.8-9.1	12-20
Gallup Sandstone	10-38	0.02-15	1-456	0-268	16-1,690	85-763	17-2,854	4-1,940	0-6.8	0-40	285-4,400	4-2,240	7.2-8.8	9-42
Dakota Sandstone	6.5-42	0-7.8	1.5-330	0.9-103	5.8-1,430	130-1,600	7.8-3,540	6-500	0.1-10	0.1-10	165-5,560	9-1,080	7.2-8.4	13-23
Westwater Canyon Member	6.2-29	0-4	1.2-373	0.2-188	9.2-1,430	60-1,200	11-3,540	0.8-374	0-1.4	0-200	168-5,560	4-1,700	7.2-9.2	14-52
Morrison Formation	7.4-18	0-0.39	7.5-221	2.2-106	24-949	168-898	17-2,380	12-118	0.2-5.1	0.1-18	264-3,760	20-988	7.5-8.3	11-24
Bluff Sandstone	9.1-27	0.09	1.2-262	0.2-64	15-543	83-539	5.8-1,930	5-2,230	0.2-1.6	0-33	196-5,000	4-916	9.2	17
Entrada Sandstone	3.9-45	0-1.2	0.4-304	0.5-587	1.2-5,740	34-1,150	16-4,110	5-9,590	0.1-5.9	0-129	171-6,410	3-3,170	6.8-9.1	12-20
Chinle Formation	6.7-23	0-1.2	60-266	14-128	1.2-426	161-702	11-1,030	4-254	0-0.8	0-105	272-2,370	72-1,040	6.7-8.2	11-46
San Andres Limestone	8.2-13	3.4-4.1	100-183	15-87	9.2-1,330	184-265	230-637	5-1,980	0.1-0.8	0-1.7	567-4,330	412-779	7.2	13-26
Glorieta Sandstone														

Source: USDI, ELM, ER AND GS 1976.

^{a/} Units of concentration are parts per million (ppm).

VEGETATION/THREATENED, ENDANGERED & SPECIAL INTEREST PLANTS/ LIVESTOCK GRAZING

Vegetation

Vegetation for the 39 tracts is represented by 11 vegetation types. The vegetation types are sagebrush, pinyon juniper, grassland, greasewood, fourwing saltbush, salt flats-halophytic, riverwash-wetland, duneland, ponderosa pine, badland and rock outcrop. These vegetation types are discussed in Appendix C. For more information about the occurrence of these vegetation types, refer to the Chaco-San Juan Planning Unit Resource Analysis--Update for Coal (USDI, BLM 1980b).

Threatened, Endangered and Special Interest Plants

There are no known populations of federally-listed threatened or endangered plant species in the EIS Region. Potential habitat for Mesa-verde cactus (Scherocactus mesa-verdae), associated with Mancos Shale outcroppings, exists in Bisti 1, 2, and 6/8 tracts. The Mancos Shale occurs specifically in the following areas; Bisti 1, T. 23 N., R. 13 W., Section 1: N1/2; Bisti 6/8, T. 23 N., R. 13 W., Section 17: NW1/4; Bisti 2, T. 24 N., R. 13 W., Section 28: NW1/4; Bisti 2, T. 24 N., R. 13 W., Section 29: N1/2; Bisti 2, T. 24 N., R. 13 W., Section 30: S1/2; Bisti 2, T. 24 N., R. 13 W., Section 31: N1/2. A 1982 printout from the New Mexico State Heritage Program shows no location of these species in the mining areas but identifies Astragalus wingatus, a State sensitive species, and proposed federal Threatened or Endangered Species on the Catalpa Canyon and Hogback tracts.

Livestock Grazing

Livestock grazing has been historically, and is presently, the primary use of the EIS Region. On most of the community allotments within the region, the majority of operators are individual Navajo family units who run small bands of sheep and goats. Many operators reside on or near the allotment(s) their livestock graze, and herd their livestock to and from their dwellings daily.

The complex surface ownership pattern in the EIS Region has severely limited livestock management by the BLM. Only those public land blocks with little or no interspersed Indian allotted lands are currently managed by the BLM.

Indian grazing allotments with small scattered tracts of public lands are administered by the Bureau of Indian Affairs (BIA) through a cooperative agreement with the BLM. The BLM leases these allotments to the Navajo Tribe, and has set carrying capacities for the public lands within the allotments. More information concerning these allotments is on file at the Farmington Resource Area Office and the BIA office in Crownpoint (Chaco-San Juan URA Update for Coal).

WILDLIFE/THREATENED OR ENDANGERED ANIMALS

The BLM and the State of New Mexico have not identified crucial habitat in the EIS Region for any wildlife species. In the southern portion of the region (the area encompassing all the tracts except the La Plata tracts), relatively few big game (except in Bread Springs, Pinehaven, Twin Butte) and non-game animals occur except during the migration of song birds. No riparian and little cottonwood-type habitat associated with washes exists in the EIS Region. A list of wildlife found in the region may be found in the Chaco-San Juan Planning Unit Resource Analysis--Update for Coal (USDI, BLM 1980b) on file at the BLM Farmington Resource Area Office.

In the northern part of the EIS Region, the BLM has identified important mule deer and elk winter range. Approximately 200 acres of this range is found on the La Plata #1 Tract, and 105 acres exist on the La Plata #2 Tract.

Within the PRLA Area, six raptor nesting sites have been identified (Appendix A-7). On the competitive coal tracts outside the PRLA Area, four raptor nesting areas were found (Appendix A-8).

The bald eagle uses aquatic habitats along the San Juan, Animas and La Plata Rivers and Navajo Reservoir. Use by eagles is documented as wintering only and no use has been noted in PRLA or lease areas. Potential habitat exists for the black-footed ferret. Gunnison's white-tailed prairie dog towns provide scattered habitats for ferrets throughout the coal lease area. A black-footed ferret survey was conducted by a biologist employed by the Public Service Company of New Mexico on a Gunnison's white-tailed prairie dog town of approximately 400 acres in size (T. 22 N., R. 12 W., Sections 2, 3). No ferret sign or activity was found (Berger, 1981, personal communication). Neither did biologists working for BIO/WEST, Inc. (1982) report ferret sign or activity at other locations.

A small spring on the Johnson Trading Post Tract provides important habitat for roosting long-eared owls and for migrating songbirds.

CULTURAL RESOURCES

Cultural resources consist of the fragile and nonrenewable remains of past human activity, occupation, or endeavors. These endeavors are reflected in districts, sites, structures, buildings, objects, artifacts, ruins, works of art, and natural features important in human events. Cultural resources span a period of at least 12,000 years. Archaeologists have divided this period into five temporal/cultural periods in the San Juan Basin.

The earliest evidence of humankind in the San Juan Basin is from PaleoIndian sites (10,000-5,000 B.C.). These sites indicate a cultural adaptation to the hunting of Pleistocene animals, including extinct bison and mammoth, the hunting of smaller game, and the gathering of wild edible plants.

The end of the Pleistocene and beginning of the Holocene are partially marked by the extinction of the larger mammals, along with a climatic change. Archaic period (5,000 B.C. - A.D. 1) sites show an emphasis on the hunting of smaller game and a greater importance placed on the gathering of plants.

The transition towards a sedentary lifestyle and the adaptation of horticulture mark the beginning of the Anasazi culture (A.D. 1- A.D. 1300). The Chacoan Anasazi culture was present throughout the San Juan Basin between A.D. 900 and A.D. 1200. This cultural system included at least 80 communities and numerous smaller sites besides the pueblos within Chaco Canyon. The outlying communities contained multi-story structures ranging in size from 10 rooms to 100, while at Chaco Canyon, pueblos containing over 800 rooms were built .

Much of the San Juan Basin was abandoned between A.D. 1300 and 1500, when the Navajo Indians entered from the north-northeast. The final cultural group to enter the basin was the Euro-Americans in about 1550, led by Spanish missionaries and explorers. Later came Spanish and Anglo settlers. Further data on the cultural sequence in the San Juan Basin can be obtained in USDI, BLM (1979c), Huse et. al. (1978), Magers (1979), Delaney and Dosh (1981), and Kemrer (1981).

As shown in Table 2-9, 638 sites (741 components) have been recorded in the portions of the competitive coal lease tracts containing federal coal or federal surface. Of these, 346 are prehistoric, 376 are historic and 19 are components of unknown affiliation. Between 10 and 15 percent of the EIS Region overlying federal coal has been inventoried for cultural resources.

Site densities have been estimated for each tract, using a model developed for the BLM by the ESCA-Tech Corporation in 1981 and known site densities from surrounding areas. All of the predicted site densities involve extrapolation and are based on judgement rather than formal statistical procedures. Between 1,727 and 2,295 sites are predicted on these tracts. (Sites predicted to occur in the areas of private coal are not included.) Additional sites were located during the BLM Chacoan Roads project conducted during the summer of 1982 (in press), but site data from this project are unavailable at this time.

Sites recorded on the tracts represent all of the five temporal/cultural periods. One PaleoIndian site has been recorded in the Bisti #2 tract, a portion of the indeterminate lithic scatters (lithic scatters without diagnostic artifacts) may have been made by PaleoIndians.

Thirty-four of the recorded components (see Glossary) have been assigned to the Archaic period, and additional Archaic sites may be represented in the indeterminate lithic scatters. The area between Bisti and Star Lake has been identified as an opportunity area for Archaic culture study due to the concentration of sites. Research here may provide important archaeological data on the Archaic occupation of the San Juan Basin.

The 158 Anasazi components date from Basketmaker II (A.D. 1-500) through Pueblo III (A.D. 1100-1300), with the highest frequency being Pueblo II (A.D. 900-1100). A portion of the indeterminate lithic scatters may also be Anasazi.

TABLE 2-9
CULTURAL RESOURCES ON THE COMPETITIVE COAL LEASE TRACTS

Tract Name	Total Sites b		Source of Prediction c/	Percent Inventoried	Site Component Affiliation											Sites Recommended National Register Eligibility	
	Known	Predicted			Paleo-Indian	Indeter- minate Lithic	Archaic	Anasazi	Navajo	Euro- American	Unknown Historic	Unknown	Total	Chacoan Road Miles	Eligible	Not Eligible	
PRLAs a/	171	542+	2	20%	2	64	34	38	46	1	8		194	26.1	133	37	
La Plata #1	8	15	1	15%				6		1	1		8		8		
La Plata #2	4	15	1	20%				4			1		5		3	1	
La Plata #3	9	15	1	13%				3				6	9		9		
La Plata #4	18	45	1	25%		1		10	1	4	2	2	20		17	1	
Crownpoint Northeast	38	110	1	10%				11	29	1		3	44	0.3	18	20	
Twin Buttes	6	234	1	10%				1	5				6		2	4	
Johnson Trading Post	9	23-48	1	10%		1			7		1		9		2	7	
Pinehaven	19	191	1	10%		3	1	11	6		3		24		17	2	
Hospah #1	4	33	1	2%		1					3		4		3	1	
Hospah #2	0	13	1	12%													
Kimbeto #1	6	50-60	3	20%		3	1		3				7		6		
Kimbeto #2	3	8	2	10%		2		1	1				4		3		
Samson Lake #1	48	32-147	1	12%				11	37		2		50		14	34	
Samson Lake #2	26	16-73	1	12%				7	20				27		8	18	
Gamerco #1 (LC)	6	1-6	1	10%				4	7				11		3	3	
Gamerco #1 Bypass (LC)	4	3-13	1	10%				4	2				6		4		
Gamerco #2	10	17-76	1	2%				8	9				17		7	3	
Divide	48	45-105	1	26%		7	1	15	21	5	3	3	55		39	9	
Star Lake East #1	17	15-35	1	33%		10	1	1	7		1		19		13	4	
Star Lake East (LC)	16	15-31	1	10%		6	1		8				16		7	9	
Star Lake West #2	0	6-13	1	15%													
Crownpoint East	36	28-208	1	12%		1			30	2	2	2	38		4	32	
Bist1 #1	78	43	2	100%		40	10	3	7		8		93		67	11	
Bist1 #2	35	12	2	55%	1	20	7	2	17				46		28	7	
Bist1 #4	7	20-86	3	6%		5			1				7	0.3	5	2	
Bist1 #6	2	14	2	1%			1		1				2		2		
Gallo Wash #1	0	6	2	10%													
Gallo Wash #2	11	6	2	15%		5		1	6			1	13		8	3	
Lee Ranch East	0	7	1	0%													
Lee Ranch Middle	23	32-43	1	18%		14	4	2		3	2		25		21	2	
Lee Ranch West	28	70-100	1	10%		15	3	4		6	16		34		25	3	
Tah-ha-bah Well	16	67	1	10%				1	17				18		3	13	
Bread Springs #1	0	16	1	0%													
Bread Springs #2	0	27	1	0%													
Sundance	17	23	1	69%				2	14		1		17		16	1	
Catalpa Canyon	0	0	1	100%													
Chico Wash South	4	76	1	1%		3		2	1			1	6		4		
Nageezi	82	336	3	20%		16	4	20	49		11	2	101	2.5	71	11	
Hogback	0	39	1	0%													
TOTALS	638	1,727-2,295			1	153	34	158	306	24	46	4	741	3.1	437	201	

a. PRLA figures not included in totals.

b. Percent inventoried and total sites are for federal surface and/or lands overlying federal coal.

c. 1. Predicted site number from within, adjacent or nearby site data.

2. Predicted site number from Kerer, 1981.

3. Predicted site number from combination of above two sources.

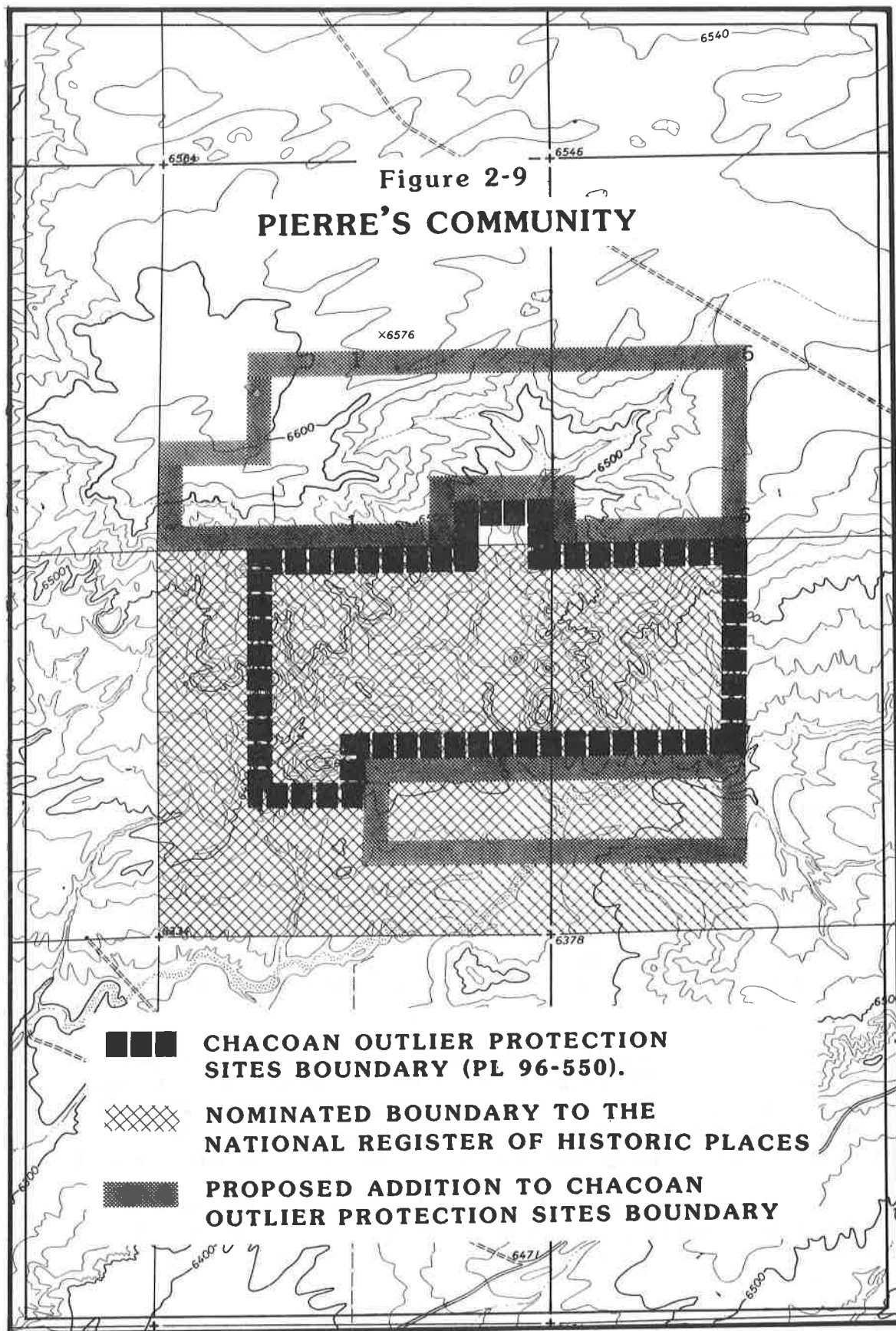
During the Bonito Phase of the Anasazi period, outlying sites across the San Juan Basin were connected to Chaco Canyon by an extensive network of roadways. Archaeologists are only beginning to realize the complexities of this site and road network, sometimes called the "Chaco Phenomenon", which has received national and international attention. The major sites along these roads and other large Bonito-phase sites are referred to as "Chacoan Outliers." The large multi-story pueblos of Chaco Canyon (Chaco Cultural National Historical Park) are believed to be the center of this social and economic system. Several of these structures currently have standing walls up to three or more stories in height. Similar structures are present at the detached parcels of the park. Seven coal tracts are within 10 miles of the park.

The Pierre's Ruin Community, a Chacoan outlier, is partially within the Nageezi Tract. The boundaries of the Pierre's Ruin Community is illustrated in Figure 2-9. A total of 440 acres has been included as a protection site under Public Law 96-550, and 420 acres of the protection site plus an additional 540 acres have been nominated to the National Register of Historic Places. An additional 580 acres are proposed for inclusion into P.L. 96-550. Of this 580 acres, 160 acres are within the National Register nomination area. The BLM and the National Park Service have discussed the possibilities of developing the Pierre's Ruin Community for visitor interpretation along with Chaco Canyon (the Chaco Culture National Historical Park) and the Chacoan Outliers.

In addition to Pierre's Site, 32 other Chacoan outliers were identified as Archeological Protection Sites under P.L. 96-550. Less than 5 miles from lease tracts are Morris 41, Raton Wells and Bisa'ani. The Holmes Group to the southeast of the La Plata tracts is also a potential Protection Site.

Over the past 2 years BLM has conducted a study on the Chacoan Roads. The project's initiation was prompted by the recognition of the importance of Chacoan roads, and the need to develop an effective management program for them in the light of widespread existing and proposed surface-disturbing activities such as coal extraction. This study has basically mitigated the impacts of surface coal mining on the known Chacoan roads.

Prehistoric Chacoan roads pass through three tracts: Nageezi, Crownpoint Northeast, and Bisti #4. Archaeological studies of the road segments on the Nageezi and Crownpoint Northeast tracts have recorded several small sites associated with the roads and definable road segments (BLM, in press). The features and definable segments have been assigned site numbers, but the roads themselves do not have numbers. A probable extension of the Ah-shi-sle-pah road has been field checked in the Bisti #4 tract and tentatively identified as a prehistoric feature. Additional archaeological survey by the Chaco Roads Project staff (BLM, in press), during 1982, has revealed that the southeast road from the Greenlee site (south) does not exist. Earlier photo interpretation had identified a road connecting the Greenlee site to the San Mateo area, crossing the Hospah #1 and Lee Ranch West tracts. Ground truthing, however, indicated that none of the imaged segments were of prehistoric origin. A spur off of the Southeast road, going from the Greenlee site to Kin Ya'a, crossing the Crownpoint East tract had also been interpreted from aerial photos. Reconnaissance along these segments indicated that they are historic features.



The 306 Navajo components date from the post-Gobernador phase (A.D. 1753-1868) and the Herding-Raiding/Post-Bosque Redondo phase (A.D. 1800-1881) to the present. Earlier Navajo sites are known to occur outside of the competitive lease tracts and may occur in them. Like the above prehistoric sites, early Navajo sites may account for a portion of the indeterminate lithic scatters. Navajo sacred sites, gravesites, and currently occupied sites are discussed in the American Indian Concerns section of this chapter.

Euro-American sites consist of Hispanic and Anglo sites. The undifferentiated historic sites include habitation sites, temporary/seasonal usage sites, trash, and any other feature to which cultural affiliation could not be assigned. The Azabache Stage Station, an early Anglo Stage stop on the route to Fort Wingate is located within an 80 acre parcel within the Chico Wash South tract which will not be included in the lease.

Additional components have been recorded for which a culture or time period could not be determined. They are considered sites of unknown affiliation.

VISUAL RESOURCES

Most of the coal tracts under consideration in this EIS are within the Chaco Planning Unit, which is characterized by low, rolling grass-sage terrain with interspersed badlands, mesas, and washes. In accordance with the Visual Resource Inventory and Evaluation System (USDI, BLM 1978), visual resource management (VRM) classes have been established for this Planning Unit.

All of the competitive coal lease tracts in the Chaco Planning Unit are either VRM Class III or IV (refer to the Glossary for definitions), although a few of them are important from a scenic standpoint due to associated recreation values. These include the Bisti #2, #4, and #8 tracts and Chico Wash South. (Refer to Visual B for VRM classes, enclosed in the Draft EIS.)

The PRLA Area receives minimal recreation use with the intent of viewing scenery. However, the area is visible from heavy use travel routes such as State Highways 57, 371, and 197; the community of Pueblo Pintado; high points within Chaco Culture National Historical Park; and some residences scattered near the PRLAs. Some of the PRLAs are located within the foreground/middle-ground distance zone of these more heavily used travel routes and populated areas.

Four of the tracts (La Plata #1 through #4) are located in the San Juan Planning Unit; no VRM classes have been established in this Planning Unit. These tracts are in the La Plata Valley away from the river. This area is characterized by pastureland with scattered pinyon-juniper; the scenic quality is not considered especially high due to the lack of landscape diversity.

All of the BLM's Wilderness Study Areas (WSAs--refer to the next section of this chapter) are designated as VRM Class II Areas. If the decision is made not to designate the Ah-shi-sle-pah WSA as wilderness, it would revert to being Class III and IV lands.

The area encompassing Chaco Canyon is also a VRM Class II Area and contains some highly scenic cultural resources that complement the attractive natural surroundings.

WILDERNESS

Four Wilderness Study Areas (WSAs) lie within the EIS Region; the Bisti (refer Map 2-3), the De-na-zin, the Ah-shi-sle-pah and the Ignacio Chavez (refer to Map 2-4). The BLM has recommended wilderness designation for the Bisti and De-na-zin WSAs, while the Ah-shi-sle-pah WSA is not being recommended for inclusion into the National Wilderness Preservation System.

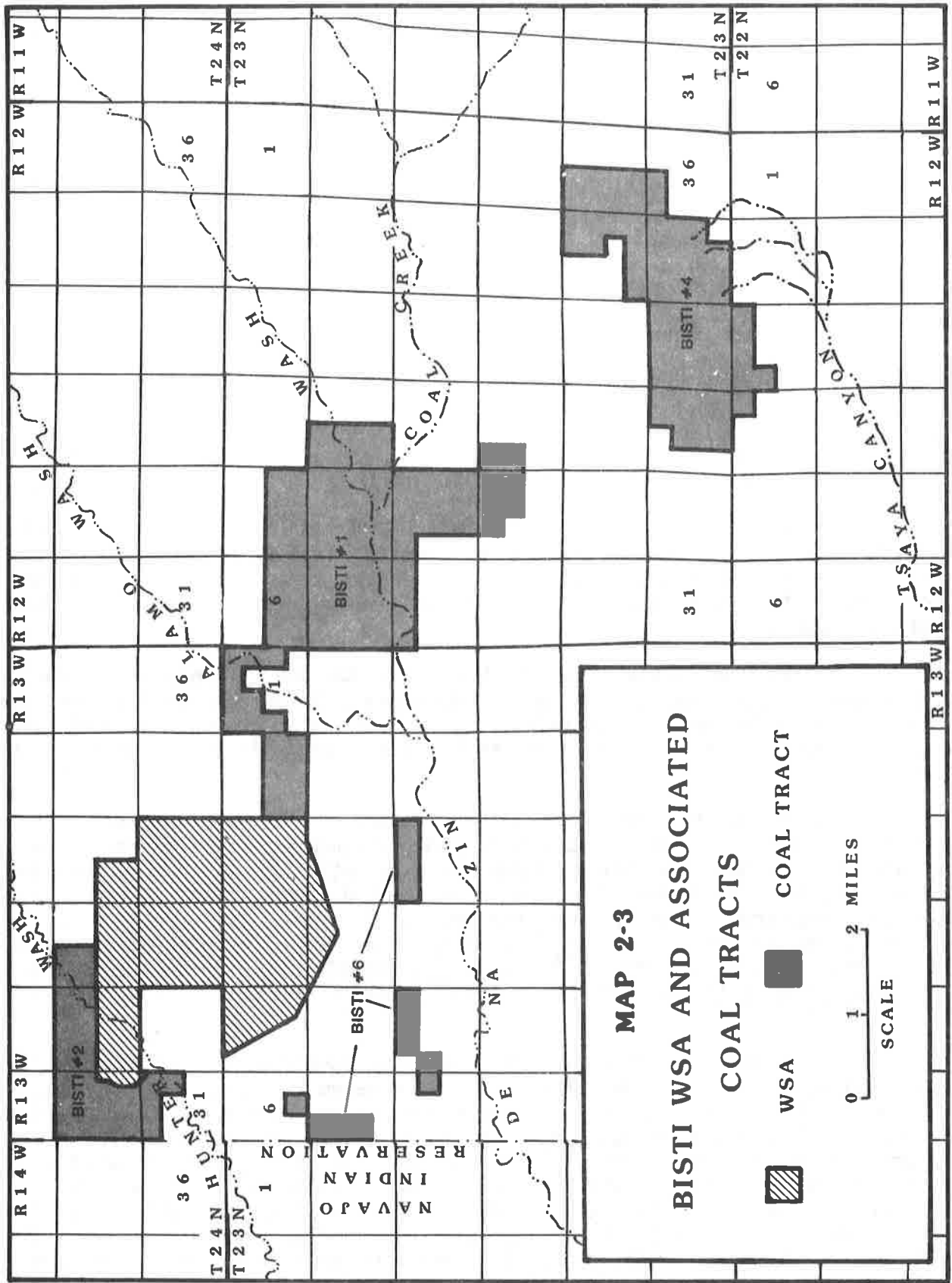
Within the general badlands and rolling terrain of the WSAs, certain areas are recognized for their special features. Mushroom-shaped rock formations, pinnacles and spires shaped by erosive forces create a "moonscape" appearance. In addition to the geologic formations, exposed petrified logs and stumps, and the remains of prehistoric animals are common. The scientifically valuable remains of vertebrates, invertebrates, and plants have given the area international prominence for paleontological study.

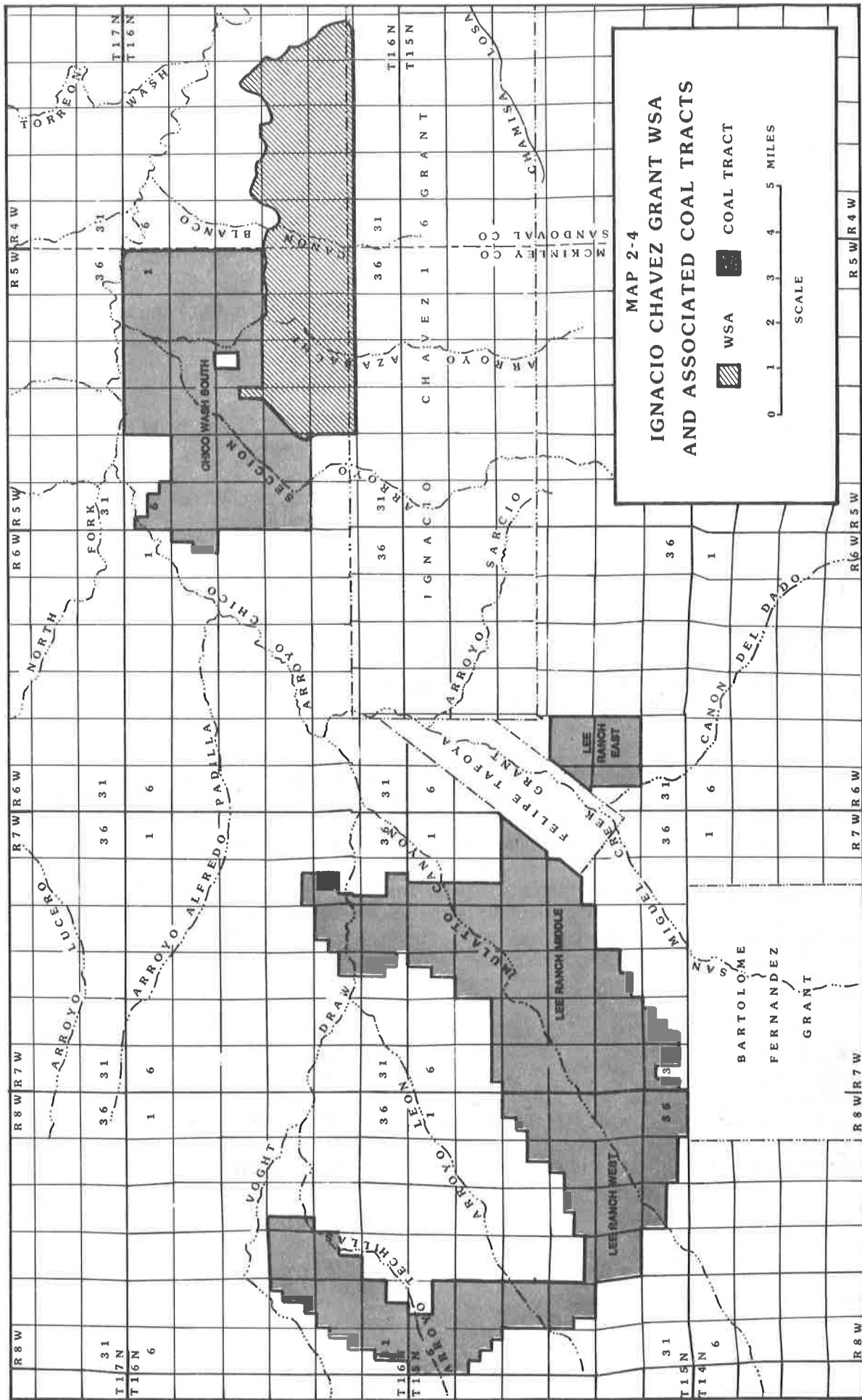
Recoverable surface and underground coal underlies the WSAs, ranging in depth from just under the surface to over 500 feet. A number of oil and gas-producing formations also underlie the general area of the WSAs, but at a greater depth than the coal beds. Scattered uranium deposits have been found underlying the WSAs.

Non-mineral activities in the area include dispersed recreation (sightseeing, collecting, hiking, and photography), livestock grazing, and use by local Navajo Indians for religious and ceremonial purposes. Archeological sites have been found, and Navajo gravesites are also believed to exist in the WSAs.

The sandstone and shale-derived soils of the WSAs support little vegetation except for some sagebrush, pinyon-juniper, and grass. These vegetational habitats provide a niche for such wildlife species as coyotes, jackrabbits, cottontail rabbits, deer mice, scaled quail, mourning dove, some passerine songbirds, snakes, and lizards. All three WSAs provide nesting habitat for raptor species of high interest, including ferruginous hawks, golden eagles, and prairie falcons. The Bisti, De-na-zin, Ah-shi-sle-pah Proposed Wilderness Areas Draft EIS (USDI, BLM 1982b) contains detailed information about these three WSAs.

The Ignacio Chavez WSA which originally consisted of 32,248 acres was under review, as well as an Environmental Assessment containing a detailed analysis of the area. These were scheduled to be released in March 1983. Because of a Department of the Interior policy change concerning split estate acreage in WSAs, the area under consideration for possible wilderness designation has now been reduced to 9,961 acres and will require additional time for study and analysis. Much of this area is the result of extensive lava flows and is located on the edge of a large mesa overlooking a scenic vista to the north and to the west. More detailed information about this area is available in the Albuquerque District Intensive Wilderness Inventory of April 1980.





RECREATION

Recreational use on public land in the EIS Region consists mostly of dispersed activities such as hunting, backcountry use, fossil collecting, sightseeing, and off-road vehicle use. Actual recreational use data for the region is not available; however, 179,235 activity occasions (refer to Glossary) were projected to have occurred on public lands in the Chaco Planning Unit in 1980.

The 50,188 acres of public land in the PRLA Area make up approximately 9 percent of the total public lands in the Planning Unit. The Planning Unit in general has not been an area of high recreational use (USDI, BLM 1980c). This can be attributed to the lack of desired recreational resources, and the difficulty experienced in traveling the majority of rough unmarked roads. The lack of usage abundant, open spaces, and natural conditions are considered by some individuals as a recreational value in themselves.

Although much of the recreation use in the region is dispersed, some specific areas have high recreation values. The Fossil Forest (Section 13, 14, 23, 24, T. 23 N., R. 12 W.) contains many in situ petrified tree stumps as well as many other fossils that attract sightseers. The Bisti and De-na-zin WSAs both contain highly scenic badlands and good backcountry use values, and both receive high visitation (especially the Bisti). The Ah-shi-sle-pah WSA also contains scenic and backcountry values.

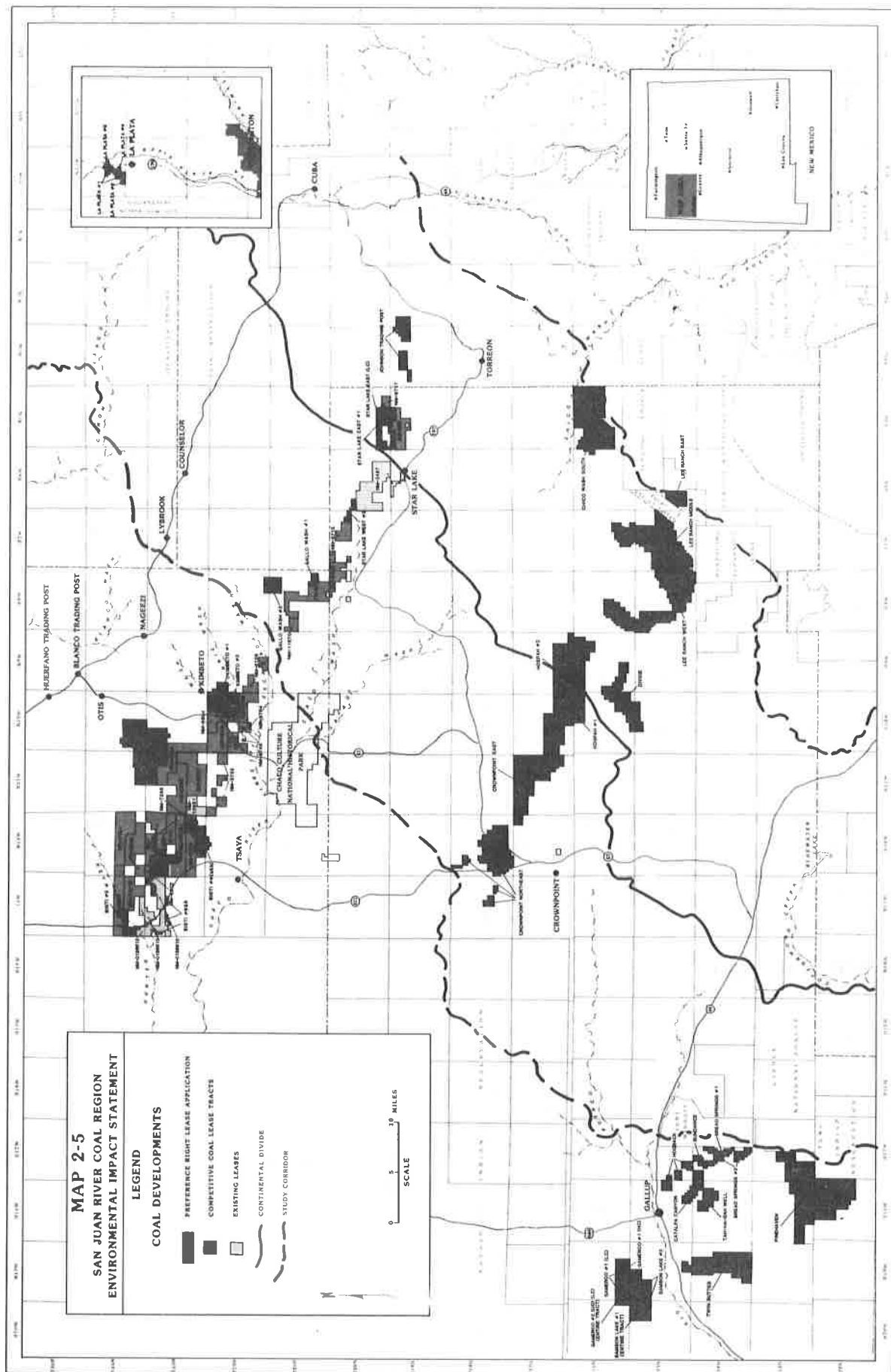
Most recreation use that is experienced in the area occurs in the spring and fall. Summer use is minimal.

One notable exception to this use pattern occurs in the Chaco Culture National Historical Park, which receives the majority of its visitor-use during the summer months. The park, run by the National Park Service, also provides the only developed recreation facilities in the immediate area of the PRLAs. There were approximately 77,000 visitors to the Park in 1981.

Chaco Cultural National Historical Park is a major recreational attraction in the basin. The park was established to recognize the unique archeological resources associated with the prehistoric Chacoan culture in the San Juan Basin and to provide for the preservation and interpretation of those resources.

Access for a majority of the visitors to the Chaco Culture National Historical Park is provided by State Highway 57. This road extends across approximately six miles of the PRLA Area north of the park.

One area in the Bisti WSA has received many management recommendations to preserve scenic and recreation values (through Wilderness designation, Area of Critical Environmental Concern designation, National Natural Landmark status, and a mineral withdrawal). This area is referred to as the "Bisti Management Area".



PREPARED BY THE ALBUQUERQUE DISTRICT, BUREAU OF LAND MANAGEMENT, JULY 1982

Public Law 90-543 of October, 1968, established the Continental Divide National Scenic Trail (CDNST) from Mexico to Canada.

The intent of the CDNST was to provide a Nationally significant trail-oriented recreation opportunity consisting of a primary trail to be located and developed to provide the traveler the opportunity to experience and reflect upon the wide variety of natural, scenic, cultural, historic, and outdoor recreation settings which are characteristic of the Continental Divide and adjacent lands. However the trail may be located through or adjacent to all other resource management activity areas where such location will not create an unacceptable safety hazard to users.

The actual treadway for the CDNST has not been established, but the basic study route is a corridor 30 miles wide and there is a zone of concern 50 miles on either side of the Divide. Relocation of segments of the CDNST are allowable but should occur within the zone of concern. Relocation or deviation from the primary route is acceptable under circumstances such as ongoing logging or mining operations that present potential safety hazards to users. Deliberations are currently under way to move the corridor several miles east of the present location, which would avoid the leasing area altogether. (L.L. Woodard, ASD, 5-21, 82) (refer to Map 2-5).

LAND USES

Facilities and improvements traversing the EIS Region include numerous power transmission lines and oil and gas pipelines. Appendices E-1 and E-2 list the various rights-of-way crossing the individual PRLAs and competitive lease tracts. These rights-of-way would fall under unsuitability criterion 2 (refer to the discussion in Chapter 1 regarding the unsuitability criteria).

Appendix E-3 lists the land use proposals located within the Preference Right Lease Applications and competitive lease tracts. These proposals are discussed in Chapter 1 under the heading, "Interrelationships with Other Projects in the Region".

TRANSPORTATION

Highways

Public roads accessing rural and suburban areas in the EIS Region include state highways, county roads, county-maintained roads, and roads maintained by the Bureau of Indian Affairs. State Highways NM 44 and U.S. 550 and Interstate 40 form the major transportation network in the EIS Region. The roads crossing the PRLAs and competitive lease tracts are listed in Appendices E-4 and E-5 and shown on Visual C, which was enclosed with the Draft EIS.

Many of the highways carry loads beyond design capacities. Road beds, surfaces, and shoulders of many highway segments have deteriorated due to increasingly heavy traffic. The average maximum vehicle capacity for a two-lane highway in northwest New Mexico is 1,400 vehicles per hour travelling at a speed of 40 miles per hour. Interstate 40 is a four-lane highway with a maximum design capacity of up to 3,000 vehicles per hour travelling at a speed of 50 miles per hour (New Mexico Highway Dept., Planning Division 1982). Table 2-10 shows the width, design speed, and condition of major highways within the EIS Region.

Increasing population is one cause for this increased traffic load. Average daily vehicle miles of travel in a five-county area of northwest New Mexico rose by more than 80 percent between 1966 and 1977, and automobile registrations nearly doubled (USDI, BLM 1979c). Average daily traffic figures for state highways and Interstate 40 are shown on Table 2-11. Average daily traffic is broken down by vehicle type.

County and other agency roads listed in Tables 2-10 and 2-11 are bladed roads with sparsely gravelled segments. Because the majority of these roads connect rural areas, traffic congestion is not a problem; however, increased maintenance and redesign would be necessary to accommodate all-weather traffic.

TABLE 2-10

HIGHWAY USE AND CONDITIONS IN THE EIS REGION BY HIGHWAY SEGMENT a/

Interstate or State Highway	Highway Segment	Miles	Surface	Width (in feet)	Design (sp. mph)	Condition Rating b/	Comments on Flow or Condition
NM 32	Gallup to McKinley-Valencia County Line.	41.5	Bituminous	22-44	60	B	13.0 miles judged unsafe, with 9.6 miles of deteriorated foundation c/.
NM 44	Rio Arriba-San Juan County Line to Bloomfield.	43.7	Bituminous	22-36	60	C	27.4 miles judged unsafe, with 17.7 miles of deteriorated surface.
NM 53	San Mateo to Grants.	20.3	Bituminous	22-50	60	C	2.3 miles judged unsafe, heavy traf- fic flow diminishes operating condi- tions.
NM 57	Blanco Trading Post to White Rock.	39.7	dirt/gravel	20	40	D	Route unimproved; poorly marked, impassable in wet weather.
	White Rock to Crownpoint	27.0	dirt/gravel Bituminous	24	40	B-D	20.3 miles unimproved, poorly marked, impassable in wet weather of remain- ing 2.8 miles unsafe, 3.9 miles of deteriorated surface.
NM 197	Crownpoint to Thoreau.	21.2	Bituminous	24	60	B	16.9 miles of deteriorated surface.
	Cuba to Torreon.	25.6	Bituminous	22-28	60	B	4.8 miles judged unsafe due to design.
	Torreon to Crownpoint.	60.0	Bituminous	25	60	A	
NM 371	Farmington to White Rock	57.9	Bituminous	30	40-50	B-D	41.5 miles unimproved, poorly marked impassable in wet weather, 5.0 miles of remainder judged unsafe due to design.
I-40	Grants to Thoreau.	24.8	concrete/ Bituminous	40	70	A	
	Thoreau to Gallup.	27.3	concrete/ Bituminous				

Source: USDI, BLM 1979c.

Notes: a/ Information not available for NM 170 and NM 509.

b/ Condition rating is based on Adjusted Rating of New Mexico Highway Department, With A-75-100,
B-50-74, C-25-49, and D-0-24 with A indicating best conditions, D worst, according to terms
of New Mexico Highway Department. Ratings for Highway Improvement: Procedures Manual, 1971.

c/ This segment resurfaced and upgraded, 1980-81.

TABLE 2-11 .

1980 AVERAGE DAILY TRAFFIC AT CONTROL STATIONS (BY VEHICLE TYPE)

Interstate Or State Highway	Highway Segment	Passenger Cars	Single Unit Trucks	Buses	Truck- Tractor Combinations	Misc. Vehicles	Totals
NM 57	12.3 miles N. of R/R crossing in Thoreau	722	1,136	19	113	21	2,191
NM 32	N. of Jct. NM 36, S. of Gallup	713	760	5	42	21	1,541
NM 44	1.5 miles S. of Bloomfield	1,919	2,565	49	468	154	5,155
I-40	5.4 miles W. of Milan	4,477	2,086	50	1,848	549	9,010
NM 53/334	1.5 miles NE of Jct. 66 at Milan	1,804	1,867	7	190	55	3,923
NM 170	N. of Jct. US 550, W. of Farmington	1,687	1,740	13	54	85	3,579

Source: New Mexico State Highway Department 1980.

Note: Figures not available for NM 197, NM 371 and NM 509.

The transportation plans of local and regional governments focus on the need for increased maintenance and improvement of roadways. New Mexico 371 is presently being redesigned and paved to accommodate existing traffic. All except a 20-mile segment between the Bisti Badlands and Crownpoint, New Mexico has been completed. Trucks haul coal on NM 371 from the existing De-na-zin (state lease) Mine, approximately 35 miles south of Farmington, New Mexico, to the San Juan Powerplant located west of Farmington. Of this segment, only approximately 5 miles have not yet been completed.

Increasing traffic and exceeded vehicle design capacities on northern New Mexico Highways have resulted in higher accident numbers and rates. Table 2-12 shows the number of traffic accident rates by highway segment for 1980.

Rail Lines

Two proposed railroads and the existing Atchison-Topeka and Santa Fe (AT&SF) Railroad cross the EIS Region. The AT&SF runs east-west through Gallup, New Mexico, located in the southern portion of the region. An existing spur line of the AT&SF runs in close proximity to the Gomerco and Samson Lake Tracts, providing a mode of coal transport. The railroads proposed to cross the PRLAs and competitive lease tracts are listed in Appendices E-4 and E-5.

The proposed route of the Star Lake Railroad runs within approximately 2 to 10 miles of all but two of the PRLAs. Coal-hauling trucks would use newly constructed coal-hauling roads or reconstructed, existing bladed roads to access loadout facilities on the Star Lake Railroad. The potential also exists for the construction of rail spurs or conveyor belts to transport coal from proposed competitive lease tracts or PRLA's. As with roads these facilities would be constructed in order to access loadout facilities.

SOCIAL AND ECONOMIC FACTORS

The EIS Region is characterized by a tri-ethnic culture--American Indian, Hispanic, and Anglo (refer to Table 2-13). This mix of cultures results in regional cities and communities that differ greatly from each other and contain internal variations as well. Differences exist in social and community organization, lifestyles, religious values, and other ethnic and racial precepts.

Demography

The EIS Region's population is centered around less than a dozen cities or towns, and most of the rural area is sparsely settled. In 1980, the region's population density was 11.5 persons per square mile, compared to 10.7 for the State of New Mexico and 62.6 for the United States (see Navaajo Chapter populations Table 2-18).

The region's population increased by more than 185 percent between 1950 and 1980, although some counties and cities showed population decreases in the 1960s. In 1950, the region was home for 11.8 percent of the state's population. By 1980, this percentage was 17.8, indicating more rapid growth in the region than in other areas of the state.

TABLE 2-12

TRAFFIC ACCIDENTS AND ACCIDENT RATES BY ROAD SEGMENT
1980

Interstate or State Highway	Segment	Number of Accidents	Accident Rate a/
NM 371	Jct. I-40 (Thoreau) Farmington	72	2.0
NM 57	Jct. 44 (Blanco T.P.) - 371	0	0
NM 32	Jct. US 60 (Quemado) - Gallup	47	1.4
NM 197	Jct. 44 (Cuba) - Torreon	17	3.8
NM 44	Jct. 25 (E of Bernalillo) - Jct. 55		
I-40	Jct. 57 (Thoreau) - Az. Line Entire New Mexico Segment	243 1566	Not avail. 0.7
NM 53/344	Milan - San Mateo	23	1.1
NM 509	Jct. 53/334 - Ambrosia Lake	5	0.5
NM 170	Farmington-Colorado State Line	20	2.1

Source: New Mexico State Highway Department 1980.

Note: a/ Accident rate shown is per million vehicle mile.

TABLE 2-13
ETHNIC MIX OF COMMUNITIES AND COUNTIES OF THE EIS REGION (1980 Figures)

County Communities	American Indian a/		White (Includes Hispanics)		White (Hispanics Only)		Black		Asian b/		Other	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<u>McKinley County</u>	36,155	65.8	14,071	25.6	7,500	13.6	313	.6	203	.4	4,208	7.7
Crownpoint Division	9,263	87.9	1,121	10.6	217	2.1	16	.2	4	.04	137	1.3
Gallup City	3,557	19.6	10,511	57.9	6,610	36.4	259	1.4	180	1.0	3,654	20.1
<u>Sandoval County</u>	9,499	27.3	20,521	59.1	9,580	27.5	300	.9	65	.2	4,414	12.7
Cuba Division	1,895	48.9	1,264	32.6	1,403	36.2	18	.5	3	.1	697	18.1
Cuba Village	53	8.7	327	53.7	429	70.4	-	-	1	.2	228	37.4
<u>San Juan County</u>	26,777	33.1	48,872	60.5	9,551	11.8	321	.4	153	.2	4,710	5.8
Aztec Division	567	5	9,955	87.7	1,698	15	21	.2	13	.1	794	7
Bloomfield Division	1,049	11.3	7,139	77.2	2,541	27.5	5	.1	6	.1	1,047	11.3
Farmington Division	3,774	10	30,905	81.6	5,172	13.7	268	.7	119	.3	2,807	7.4
Farmington City	2,626	8.5	25,284	82.3	4,429	14.4	245	.8	104	.3	2,470	8.0
<u>Valencia County c/</u>	8,368	13.8	43,334	71.2	26,857	44.1	343	.6	140	.2	8,668	14.2
Grants Division	2,909	11.9	17,703	72.4	10,627	43.5	156	.6	59	.2	3,608	14.8
Grants City	215	1.9	9,322	81.4	5,908	51.6	72	.6	39	.3	1,803	15.7
Milan Village	151	4.0	3,034	81.0	1,770	47.2	70	1.9	10	.3	482	12.9

Source: U.S. Department of Commerce 1981.

Notes: a/ Also includes Eskimo and Aleut.

b/ Also includes Pacific Islander.

c/ Includes what is now Cibola County.

This overall rapid growth has resulted from energy-associated development. Population projections show the growth in the four counties included in the EIS Region continuing through the year 2000. Substantial population growth is projected even for some of the small communities within the region. This rapid growth contributed to each of the counties in the region being designated as energy-impacted counties under Section 601 of the Powerplant and Industrial Fuels Use Act of 1978.

Some counties and communities have specific growth problems that do not follow the regional pattern. For example, nearly all of McKinley and San Juan Counties have been influenced by energy-related activity in the region, while only Cuba in Sandoval County and the Grants-Milan area of Cibola (previously Valencia) County feel these direct influences.

The population of the village of Cuba in 1980 was 605 people, a growth of 47 percent since 1970. However, within the 3-mile planning perimeter, there were about 1,110 people (Middle Rio Grande Council of Governments, 1980). The Grants-Milan area of Valencia (now Cibola) County has a population of 15,198 in 1980, a growth of 38 percent since 1970. This area is made up of two separate cities adjoining one another. Each city struggled to meet the needs of the expanding population in the 1970s, but reduced demand in the uranium industry in the 1980s has caused somewhat depressed economic conditions. Milan, the smaller of the two communities, had a 68 percent population increase in the 1970s, but is currently looking for some industry to replace the jobs lost in the uranium production slowdown.

Housing

The housing supply has nearly doubled in the last decade in the four-county area affected by mining in the EIS Region. The housing supply in San Juan and McKinley Counties from the 1980 census stood at 28,380 and 17,059 respectively. Woodward-Clyde Associates, Inc. estimated that, in 1981, 46 percent of this supply was in areas most likely to be affected by coal mining. In 1980, Valencia and Sandoval Counties had housing supplies of 21,862 and 11,898 respectively (refer to Table 2-14).

The type of housing has changed notably during this ten-year period. The proportion of mobile homes in the four-county area was 9.5 percent of all homes in 1970, and 18.6 percent in 1981. The percent increase annually by county for mobile homes was: McKinley County, 15.5 percent; Sandoval County, 37.9 percent; San Juan County, 29.1 percent; and Valencia County, 26.9 percent. Multi-family home numbers also increased, going from 9.2 percent of all homes in 1970 to 12.3 percent in 1981 in the four counties. Single-family homes decreased from 80.3 percent of all homes to 66.7 percent (four-county total) during this same period.

The housing vacancy rates for the EIS Region are listed in Table 2-15. It is estimated that 6,000 of these homes (17 percent) are in the area likely to be affected by coal leasing.

Water Supply

Data available indicates that most communities have water rights adequate for their present needs. Notable exceptions to this appear to be the

TABLE 2-14

HOUSING SUPPLY SUMMARY
NUMBER OF HOMES BY TYPE
(1970 - 1980)

	McKinley		Sandoval		San Juan		Valencia		Four-County Area	
	1970	1980	1970	1980	1970	1980	1970	1980	1970	1980
Total Yearround Housing Units	10,506	17,059	4,602	11,898	14,746	28,380	11,363	21,862	41,217	79,199
Single Family Units	8,302	11,430	4,205	9,751	11,513	17,292	9,341	14,167	33,361	52,604
Multiple Family Units	1,428	2,930	158	948	1,636	4,095	634	2,200	3,856	10,173
Mobile Family Units	776	2,699	239	1,235	1,597	6,993	1,388	5,495	4,000	16,422

Source: University of New Mexico, Bureau of Business and Economic Research, 1982, and New Mexico State Automatic Data Processing Department, 1982

TABLE 2-15
HOUSING VACANCY RATES FOR THE EIS REGION a/

County	Total Number of Units	Number Vacancy	Percent
McKinley	18,128	1,981	10.9
Sandoval	12,286	1,434	11.7
San Juan	29,730	3,360	11.3
Cibola b/	3,977	456	8.7

Source: University of New Mexico, Bureau of Business and Economic Research, 1982.

Notes: a/ These are 1980 figures. The numbers are probably higher now due to the slump in oil and gas and uranium activity.

b/ These figures are for the city of Grants only.

cities of Aztec and Bloomfield, where annual rights are shown as 1,178 and 400 acre-feet, respectively, and use is shown at 1,188 and 1,100 acre-feet, respectively (refer to Tables 2-16 and 2-17). While the figures for Gallup do not show any shortage in water rights, Gallup has had concerns over an adequate water supply for its projected growth and has gone to great expense to find adequate water for its needs. Several community and individual water systems exist throughout the EIS Region.

Wastewater Systems

Figures available indicate that Farmington, Aztec, and Crownpoint are each operating their wastewater treatment facilities at capacity. Figures for other communities show use capacity ranging from 33 to 60 percent. In addition to unused capacity, plant modification could add capacity to the Farmington and Aztec systems. Farmington has also indicated a need for sewerline replacement.

In rural areas, many homes are served by individual septic systems.

AMERICAN INDIAN CONCERNS

Indian Tribes in the EIS Region

The EIS Region is located within the State of New Mexico's newly created 3rd Congressional District. This district contains nearly all of the state's 110,000 American Indians, including 41 chapters of the Navajo Nation, the Jicarilla Apache Reservation, and 19 pueblos (Steinberg, 1982). Approximately one-half the population of the state's San Juan and McKinley Counties, where the competitive coal lease tracts are located, is made up of American Indians, principally Navajo (Woodward-Clyde, 1982).

The Zuni Reservation and the Ute Mountain Reservation are adjacent to competitive coal lease tracts on the extreme northern and southern portions of the EIS Region. The BLM has made initial contact to notify these tribes of potential leasing in the area. The Apache Tribe lies to the east of the San Juan Basin Coal Region.

The Jicarilla Apache Tribe

The Jicarilla Apache Reservation encompasses 750,000 acres in north central New Mexico, which lies to the east and is adjacent to the San Juan Coal Region. The tribe has an estimated 1983 population of 2,300. Neither the PRLAs nor the competitive tracts lie within the reservation boundary.

Their principal source of income comes from oil and gas royalties, agriculture, ranching, recreation, crafts and local business. They have plans for an extensive 20 to 30 thousand acre irrigation project towards the southern end of the reservation as well as the many small tracts of farm lands. Large amounts of water are required for farming and ranching operations as well as for oil and gas recover. Because of these type of operations water has become a very critical factor in maintaining the economic stability of the tribe.

TABLE 2-16

COMMUNITY WATER SYSTEMS

	<u>Farmington</u>	<u>Aztec</u>	<u>Bloomfield</u>
Source	Animas and San Juan Rivers	Animas River	San Juan River
Annual Rights (acre-feet)	18,103	1,178	400
Treatment Capacity			
Annual (acre-feet/yr.)	44,809	1,608	1,680
Daily (Gallons/day)	40,000,000	1,500,000	1,500,000
Storage Capacity			
Raw (acre-feet/yr.)	7,620	31	80
Treated (Gallons/day)	16,500,000	3,250,000	750,000
Use			
Annual Withdrawal (acre-feet/yr.)	14,179	1,188	1,100 <u>a/</u>
Peak Day (Gallons/day)	23,000,000	2,100,000 <u>a/</u>	2,000,000

Source: Woodward-Clyde Consultants, 1982; New Mexico State Engineers Office, 1982; New Mexico State Planning Division, 1982; New Mexico State Economic Planning Division, 1982; and Cuba Engineers Office, 1982.

Note: a/ Estimated.

TABLE 2-17

COMMUNITY WATER SYSTEMS
(Wells)

Source	Gallup	Crownpoint	Thoreau	Grants-Milan	Cuba
Annual Rights (acre-feet)	847 Permitted 10,645 Declared	a/	200 Afy	2,990	Not allowed at pre- sent
Treatment Capacity					
Annual (acre-feet)	4,201	973	205	7,706	600
Daily (Gallons/day)	3,750,000	868,320	208,800	6,695,000	535,568
Sewage Capacity Type	Primary- secondary	4-Cell lagoons	Lagoon	Activated slush plant	2-Cell lagoons w/sand filter
Capacity (1980) (Gallons/day)	2,500,000	a/	a/	2,000,000	120,000
Use as a % of Capacity	44%	100%	33%	50%	60%
Use					
Annual Withdrawal (Acre-feet)	2,738	900	120	2,987	358
Peak Day (Gallons/day)	2,500,000	800,000 Est.	a/	4,800,000	a/

Source: Woodward-Clyde Consultants, 1982; New Mexico State Engineers Office, 1982; New Mexico State Planning Division, 1982; New Mexico State Economic Planning Division, 1982; and Cuba Engineers Office, 1982.

Note: a/ Figures not available.

The Navajo Tribe

All of the proposed EIS Region, with the exception of the four La Plata tracts north of Farmington, lies within the Eastern Navajo Agency. This agency is an off-reservation administrative unit of the Bureau of Indian Affairs (BIA)/Navajo Nation. The agency had an estimated 1980 Navajo population of 35,407 (USDI, BIA 1982). This population is subdivided among chapters and districts, the basic political units of Navajo Tribal Government.

Seventeen chapters within Districts 15, 16, and 19 are located within PRLAs or competitive lease tracts. The names of these chapters and their estimated 1980 Navajo population are shown in Table 2-18. Agency, district and chapter boundaries are shown on Visual D, which was enclosed in the Draft EIS.

Navajos Living on the PRLA Area

As shown in Appendix F-1, Navajos live on six of the PRLAs proposed for surface mining and one PRLA proposed for underground mining. Of the 18 residence groups living on the PRLAs, 7 are located on public lands, 1 is on a homestead, 7 are on Indian allotments, 1 is on surface withdrawn for Indian use under Public Land Order (P.L.O.) 2198, and 2 are on surface owned by the Navajo Tribe. (Refer to the Glossary for definitions of these forms of ownership.)

Surface ownership in the Eastern Navajo Agency is typically in a patchwork pattern. Families not authorized to live on public domain lands occur throughout the area administered by the Eastern Navajo Agency. In many cases, these are families who have been living in the same location for two to three generations or longer. Serious land management problems have developed as a result of the occupancies and the complex ownership pattern. The most recent effort to resolve some of the problems is a proposed land exchange between the U.S. Government and the Navajo Tribe (refer to the land use section of this chapter). Some unauthorized Navajo families located on the competitive lease tracts are included in this proposed exchange.

Seven Navajo residence groups not authorized by the BLM are living on public land. They are excluded from the above exchange because the PRLAs are pre-existing lease applications for federal coal.

The 39 households on the PRLAs represent separate nuclear families. Based on an average nuclear family size of 5.8 members (Arthur, 1978), these nuclear family households could include 226 individuals. Many Navajos feel strong emotional ties for a household associated with a residence group living in a particular geographic locale. It is known that adults working elsewhere regard the households/residence groups on the PRLAs as their real home and return as frequently as possible.

A total of 55 residences occur on the PRLAs. One-third of the households own two or more residences. This quantity of housing may reflect the fluctuating household requirements for sheltering returning family members. The variety of building styles appears to reflect specialized ceremonial requirements. One-third of all residence groups have at least one hogan, a building essential for the performance of curing ceremonies.

TABLE 2-18

POPULATION OF NAVAJO CHAPTERS
PRINCIPALLY AFFECTED BY PROPOSED LEASING
(1980 Population Estimates)

District Chapter	Estimated Population
District 15	
Becenti	615
Crownpoint	1,609
Lake Valley	648
Little Water	912
Pueblo Pintado	1,169
Torreon	1,668
Whitehorse Lake	968
White Rock	399
SUBTOTAL	7,988
District 16	
Bread Springs	1,046
Chi-Chil-Tah	2,180
Church Rock	2,563
Red Rock	1,808
Tsayatoh	889
SUBTOTAL	8,486
District 19	
Counselor	1,117
Huerfano	2,368
Nageezi	1,341
Ojo Encino	772
SUBTOTAL	5,598
TOTAL	22,072

Source: USDI, BIA 1982

Approximately 10 percent of the residences have piped water, but domestic water must be hauled to the remaining residences. Many families travel several miles to the nearest source of water, usually a BLM, BIA or Navajo Tribe well. Approximately 53 percent of the Navajos in the Shiprock Agency haul water (Arthur, 1978). This situation is also assumed to occur on the proposed competitive lease area outside the PRLAs.

Navajos Living on the Competitive Tracts

Families on the competitive coal lease tracts were inventoried by BLM personnel flying parallel transects by helicopter across each tract. A total of 345 residences were recorded on surface mineable tracts and 110 residences on underground mineable tracts. Surface ownership and legal descriptions of these residences are shown in Appendices F-2 and F-3. Visual D shows the number of residences per tract, along with the number of residences and households on the PRLAs. It is assumed that clusters of residences on the tracts probably reflect residence groups, but this has not been confirmed by field interviews. (As is evident from the discussion of families on the PRLAs, the number of residences does not necessarily represent an accurate measure of the number of households that may be present.)

Social and Economic Patterns

It is estimated by BLM personnel that approximately 65 percent of fulltime Navajo residents on the PRLAs and competitive lease tracts are non-English speaking. While there is known to be considerable variation in social and economic behaviors from one family to another, traditional social and economic patterns generally remain strong among rural Navajos throughout the area surrounding the EIS Region. The following discussion relates to social and economic patterns known to prevail on the PRLAs and believed to be typical of all or the majority on the competitive coal lease tracts.

Livestock grazing is the principal economic activity on the PRLAs. It is estimated by the BLM to account for approximately 30 percent of the average income. Ninety-four percent of the residence groups have access to one or more grazing permit(s). As shown in Appendix F-1, corrals, barns and other livestock facilities are shared by the households within residence groups. It is projected that extensive pooling of labor, money, and personally owned property such as vehicles also occurs between full-time and part-time residents.

Livestock grazing in the Eastern Navajo Agency is administered under a 1968 Cooperative Agreement between the Navajo Tribe, the BIA, and the BLM. Under the terms of the 1978 revision to this agreement, the majority of the grazing on the competitive coal lease tracts is administered by the BIA-Navajo Tribe. Seventy-seven percent of the livestock permits held by occupants on the PRLAs are BIA-Tribal permits.

Grazing permits are valued property and permits relinquished through death are transferred within families whenever possible. Demand for grazing use areas exceeds the available permits. Conflicts over grazing boundaries between use areas are common.

The Navajo Tribe has selected 35,000 acres of public land in New Mexico under the provisions of the Navajo and Hopi Settlement Act (P.L. 93-531,

as amended by P.L. 96-305, (Refer to Chapter 1, the section entitled "Interrelationships With Other Projects in the Region"). The Department of the Interior has this selection under active consideration but has not decided to approve it. Because of the interest shown in lands in the Bisti/De-na-zin area, it is anticipated that an unknown number of Navajo families from the former Navajo-Hopi Joint Use Area in Arizona will be resettled on lands selected by the Navajo Tribe on or around the competitive coal lease tracts. This will not create any additional conflicts with Navajos in the area since the selection has been made within the Paragon Resource Allotment, a private non-Navajo allotment.

The location of water is a critical factor in the management of livestock operations within use areas. The number of natural springs is limited. Deep wells provide the major source of livestock water, with some seasonal water available from earthen tanks and shallow wells dug into washes. When water is available, livestock operators with sufficiently large use areas rotate their stock among seasonal pastures. Some livestock operators make use of seasonal residences in conjunction with range rotation, still another factor accounting for the number of residences per household.

Sheep and goats are a traditional source of cash income, and these animals remain important in the economics of some families.

Rug weaving is also an important source of supplemental income for some families in the EIS Region. Handcrafts are particularly important during periods of economic adversity such as the present, when Navajo unemployment has reached a reported rate of more than 75 percent (Albuquerque Journal, 1982). While the income realized per hour of labor is notably low for weavers, supplies of locally produced wool are available at a nominal cost. A variety of minerals and plants are gathered by weavers, including gypsum (used to remove grease from white wool), yucca (used as a cleaning agent), and such plants as snakeweed, serviceberry and Mormon tea (used as natural dyes).

Gravesites

Archaeological evidence indicates that the Navajos have been living continuously in the EIS Region for the past two to three centuries. The earliest presently known Navajo site on a competitive lease tract has been dated to the Developmental Herding Period (A.D. 1696-1800). The majority of Navajo occupation sites in the region date from the Post-Bosque Redondo Period (A.D. 1868), with the greatest amount of settlement occurring in the present century. Due to the length of time the Navajo have occupied the EIS Region, substantial numbers of gravesites may be present (refer to USDI, BLM, 1981a and 1981b for a discussion of Navajo burial practices).

Some gravesite locations have been identified to the BLM. As shown in Appendix F-4, 6 graves have been identified on surface mineable PRLAs, 5 graves on underground mineable PRLAs, and 25 to 35 graves on surface mineable competitive lease tracts. The locations and numbers of these graves have not been confirmed by the BLM. The precise location of Navajo graves is often difficult to determine, but the general locations of most burials from the past one to three generations could probably be identified through systematic personal interviews supplemented by visible archaeological evidence.

Sacred Sites

According to data collected by the Shiprock Research Center in 1975, 47 percent of Navajos report a religious affiliation with the traditional Navajo religion. Others are affiliated with the American Indian Church (Woodward-Clyde, 1982). Plants and minerals gathered from prescribed locations are essential to the ceremonial practices of both these groups. No systematic effort has been made by the BLM to identify all gathering areas in the EIS Region, but two gathering areas have been identified on surface mineable competitive coal lease tracts (refer to Appendix F-5).

Four offering points have been identified on surface mineable PRLAs, one possible offering point associated with water on a surface mineable competitive lease tract, and a sacred site of unknown type on an underground mineable competitive lease tract.

Additional sites of various types may exist. Several medicine men have informed the BLM that they consider the entire area between the four sacred mountains of the Navajo to be holy land. People are reluctant to discuss gravesites and sacred areas. As a result, it is difficult to collect accurate information about these subjects.

CHAPTER 3

ENVIRONMENTAL CONSEQUENCES



CHAPTER 3

ENVIRONMENTAL CONSEQUENCES

INTRODUCTION

This chapter addresses the impacts that would result from coal mining on 39^{1/} competitively leased tracts and 26 PRLAs in the New Mexico portion of the San Juan River Coal Region. These tracts have been grouped into four production tonnage levels, from competitive tracts (128.5 million, 916.0 million, 1.32 billion, and 1.94 billion) and from PRLAs (1.4 billion tons) in order to facilitate impact analysis. Each tonnage level is associated with one of the alternatives described in Chapter 1.

This impact analysis deals primarily with the cumulative significant impacts resulting from the construction of facilities and the mining of federal coal. Site specific data and impacts by PRLA and competitive coal lease tracts have been considered and are presented in Appendices A-1, A-6, B-1-9, and F-1-5. (Lease terms and maps displaying special resource concerns by PRLA tracts are available for public review in the Albuquerque District and Farmington Resource Area offices. Other site specific impacts, visuals, and maps on the PRLAs are located through out the Draft and Final PRLA EA.) The site-specific impacts resulting from specific actions presented in mine plans developed for any leases that might be issued will be analyzed in more detail in environmental documents prepared by the Mining and Minerals Division, New Mexico Energy and Minerals Department and the Office of Surface Mining (OSM) when each mine plan is submitted.

ANALYSIS FRAMEWORK

GENERAL

The discussion is a worst-case analysis for each alternative. On some tracts, the amount of federal coal reserves is nearly negligible, and these tracts will likely be mined for their private reserves even if the federal reserves are not leased. Although this EIS analyzes the impacts of mining these entire tracts, though most of their reserves are non-federal, the non-federal coal will not be included in any coal lease sales.

It is possible, though unlikely, that impacts discussed in this chapter may begin to occur earlier than indicated in the analysis. Impacts beyond the year 2000 are too speculative to analyze.

Coal mining unsuitability criteria have been applied as required by 43 CFR 3461. Refer to Table 1-5 for a listing of those lands that have been dropped from further consideration because of the application of the unsuitability criteria.

1/ (See Preface.)

Under Preference Right Lease Issuance impact analysis is summarized from the impact analysis found in the Final Environmental Assessment for Coal Preference Right Leasing, New Mexico (the "PRLA-EA"; USDI, BLM 1981b). Additional impact analysis was provided for air quality, land uses and American Indian Concerns because these disciplines were not covered in the above document.

Chapter sections discussing mitigating measures, unavoidable adverse impacts, short-term use versus long-term productivity (except for non-renewable resource components), and irreversible and irretrievable commitments of resources are located after the analysis of the impacts under the High Alternative.

ASSUMPTIONS

The assumptions used for impact analysis in this EIS for Preference Right Lease Issuance and the competitive lease alternatives are enumerated by resource component below.

GENERAL

1. The Star Lake Railroad, including spurs and loops, would be available to transport the coal by 1987.
2. Power would be delivered by the Fruitland Coal Load Transmission Line.
3. There would be zero discharge from point sources to waterways at support facility sites.
4. Haul roads, utility easements, and other associated facilities would undergo impact analysis as rights-of-way applications are received. It would not be until applications were submitted that the specific locations, alignment and other right-of-way information would be developed by applicants meeting the final showing requirements for PRLA.
5. Production from logical mining units would begin within 10 years of the issuance of a lease and would meet statutory and regulatory minimums.
6. Post-mining land uses would, in general, include the present land uses of livestock grazing, wildlife habitat, and recreation.
7. The federal coal under the PRLAs may be combined into logical mining units with state and private coal.
8. For the purposes of a maximum coal analysis it is assumed that markets will be available in and outside the San Juan River Coal region. Thus all tracts would be leased and developed. However, the probability of this occurring is low.
9. For the majority of the tracts, start-up of construction and production on the competitive lease tracts will occur in 1986 and 1987 respectively.

Approximately 50 percent of the 39 tracts would start production and mine a total of 8.09 million tons in 1987. Peak production will occur in the year 2000.

Significant impacts will begin with actual production. Assuming that leases for the tracts discussed under the various alternatives are issued in 1984, production will begin no later than 1994 as required by the Mineral Leasing Act.

10. In general coal recovery tonnages are based on a 50 percent rate for underground mines and an 85 percent rate for surface mines. Exact rates are difficult to assess because of numerous variables that affect recovery rates.
11. Leasing/production from one tract or cluster of tracts, i.e. Gallup tracts or La Plata tracts, will have no effect on impacts from another tract; impacts will not exacerbate each other.
12. The predicted archeology site figures have been made assuming that the sites are evenly distributed across each tract.
13. All mining would be done in accordance with all statutory and regulatory minimums, including the requirements in the standard coal lease form as modified to include stipulations necessary to ensure compliance with the Bureau's review of the lands for unsuitability for surface coal mining under 43 CFR 3461.1. All required mitigation and lease terms have a high probability of being effective in achieving the intended regulatory goal.
14. All active mines would be inspected by OSM and the State of New Mexico for compliance with these requirements. Inspections would be required on an average of once a month.

AIR QUALITY

The background air quality value for the EIS Region is assumed to be 30 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) as recorded at Zuni, New Mexico. The existing mines and facilities are assumed to be part of the present background and are not analyzed separately.

TOPOGRAPHY AND MINERAL RESOURCES

Competitive coal lease tracts in the Bypass Alternative will be developed in conjunction with adjacent existing leases or PRLAs.

VEGETATION/LIVESTOCK GRAZING

Mined lands will not generally be available for grazing during the entire life of a mine, even though the tract has been revegetated. However, the potential does exist for limited grazing once reclamation has been satisfactorily completed for a portion of the permit area to the standards of the regulatory authority for bond release.

WILDERNESS

Coal lease NM-0186613 and the northern portion of lease NM-0186612 will be exchanged for comparable leases in the Bisti #1 Tract (refer to the Draft Bisti Coal Lease Exchange Environmental Assessment (USDI, BLM 1982c)).

RECREATION

The entire area of surface disturbed by each mine will be closed to public use for the life of the mine.

TRANSPORTATION

1. State highways will be utilized by commuting workers in car pools, rather than the less direct routes of unimproved county and other agency-maintained roads at a rate of two persons per vehicle.

SOCIAL AND ECONOMIC FACTORS

1. Increases under 10 percent are not significant and are not included in the EIS.
2. Net taxable values are \$2.5 million dollars per million tons of annual production for surface mining, and \$8.33 million dollars per million tons of annual production for underground mining.
3. Severance tax (including surtax) is \$.73 per ton.
4. Tax rates are in dollars per \$1,000 of net taxable value as used in the 1980-81 tax year.
5. For underground and surface mines respectively, 30 and 50 percent of the newly hired work force would be local hires, and 70 and 50 percent would be immigrants to the region.

INTRODUCTION TO THE ALTERNATIVES

The first section, No Action Alternative, is the No Action Alternative for the PRLA processing. The No Action Alternative plus the 26 Preference Right Lease Issuance forms the basis for the "No Action Alternative" for the competitive coal leasing. In each section the discussion first analysis the impacts of an alternative and then the cumulative impacts of mining under that particular No Action Alternative or action.

The cumulative impacts of coal and non-coal projects are summarized at the end of Chapter 3.

EXISTING COAL LEASES

IMPACTS - NO ACTION ALTERNATIVE

This alternative proposes no new leasing of federal coal. Coal production would result from the development of coal from existing and proposed coal mines with in-place coal reserves of approximately 3 billion tons. About 2 billion tons are under filed mine plans, not all of which are as yet approved. About 1 billion tons are under contract commitment. Projected coal production in 1987 and the year 2000 would be approximately 39.4 and 16.5 million tons, respectively.

AIR QUALITY

Expected development of the coal would result in an increase in particulates in the vicinity of the mines. The increase in other pollutants (sulfur dioxide, nitric oxides, carbon monoxide, hydro-carbons, ozone, and lead) resulting from the mining operations would be immeasurable on a regional scale and insignificant.

Dispersion modeling was conducted for the various alternative levels of coal mining. The values obtained by this modeling were then added to the assumed background level of 30 ug/m^3 . These values were then compared with the annual NAAQS and the New Mexico standards.

The increase in the annual average ambient TSP concentrations due to expected development is estimated to be 5 ug/m^3 .

The 24-hour averages in table 3-1 show that when added to the background this would give estimated values of $<100 \text{ ug/m}^3$. This value is below the applicable standards.

The greatest contribution to the predicted concentrations would be vehicular travel on unpaved roads. This includes truck haulage of coal, employee traffic, and general use of unpaved roads by the increased population of the northwestern New Mexico region.

Most of the particles that contribute to the increased concentration of TSP are large and would settle out within approximately one mile of the source. Terrain provides a barrier to particulate movement and causes variation in wind flow, which would tend to disperse these pollutants.

Table 3-1a shows that annual visual range reductions can be expected to be decreased by less than 8 percent from the base visual range of 73 miles. Short-term (24-hour) concentration would result in less than a 50 percent decrease in visual range.

The impact to visual range from increased population in cities and towns would be greater than the impact from coal production activities as TSP emissions from cities have more small particles than mining caused emissions. Small particles are more effective than large particles in scattering light and thus are more effective in reducing visual range.

Based on the use of the NAAQS and Prevention of Significant Deterioration (PSD) standards as a measure of significance, the calculated increased TSP concentrations from this alternative would not result in a significant air quality impact.

TABLE 3-1

TOTAL SUSPENDED PARTICULATES (TSP) EXCEEDED BY ALTERNATIVE
(24-Hour Average)

Alternative	Total TSP <u>a/</u>	TSP Exceeded <u>b/</u>
No Action (Base 80 ug/m ³)	<100 ug/m ³	-----
Preference Right Lease Issuance	100 ug/m ³	-----
Bypass <u>a/</u>	163 ug/m ³	13 ug/m ³
Minimum Surface Owner Conflicts <u>a/</u>	234 ug/m ³	84 ug/m ³
Target <u>a/</u>	234 ug/m ³	84 ug/m ³
High <u>a/</u>	236 ug/m ³	86 ug/m ³

Note: a/ Total includes that for the No Action Alternative and PRLA.
b/ New Mexico State 24-hour standard for TSP is 150 ug/m³.

TABLE 3-1a
ANNUAL AVERAGE VISUAL RANGE REDUCTIONS BY ALTERNATIVE

Alternative	Visual Reductions <u>a/</u> (Miles)	Cumulative Visual Reductions (Miles)	Visual <u>a/</u> Reductions (%)	Cumulative Visual Reduction (%)
No Action (Base 73 Miles)	<u>b/</u>	<67	<u>b/</u>	<8
Preference Right Least Issuance	6 <u>c/</u>	67	8 <u>c/</u>	8
Bypass	2	65	3	11
Minimum Surface Owner Conflict	7	60	10	18
Target	7	60	10	18
High	7	60	10	18

a/ Impacts are attributable solely to this particular alternative or action.

b/ Data not available.

c/ This figure includes the No Action Alternative.

TABLE 3-2
TOTAL ACRES DISTURBED BY ALTERNATIVE

Alternative	Surface Disturbed (Acres)		Surface Facilities (Acres)	Total Surface Acres
	1987	2000		
No Action ^{a/}	8,000	16,000	1,000	25,000
Preference Right Lease Issuance ^{a/}	1,500	10,000	705	22,020
Bypass ^{a/}	364	1,342	600	6,130
Minimum Surface Owner Conflicts ^{a/}	308	4,988	1,050	19,302
Target ^{a/}	859	10,593	2,100	35,977
High ^{a/}	1,774	23,641	3,500	68,641

Note: ^{a/} Impacts are attributable solely to this particular alternative or action.

TOPOGRAPHY AND MINERAL RESOURCES

Mine-site preparation would involve alteration of the natural topography. However, the mining phase of the operation would have a much greater impact on topography, because the overlying strata would be blasted, removed and stockpiled. The destruction of all topographic features in a mined area would result in the most significant impacts to paleontology, livestock grazing, cultural, and visual resources. Impacts are discussed under this and Preference Right Lease Issuance.

The primary impact on the mineral resource of the EIS Region would be the removal of the coal beds and destruction of the overlying strata by surface mining. Table 3-2 shows that under this alternative, approximately 8,000 and 16,000 acres would be disturbed in 1987 and the year 2000, respectively. A total of 25,000 acres would be disturbed over the life of the mine by mining.

Construction of mine and transportation facilities would result in the consumption of sand and gravel. The location and amount of these materials in the quarries cannot be approximated at this time.

Exploration for or recovery of oil and gas is currently at a low level. Once coal mining is completed, exploration and recovery of oil and gas could occur.

PALEONTOLOGY

Expected development could destroy paleontological resources of the Late Cretaceous Crevasse Canyon, Menefee, Fruitland and Kirtland Formations. Fossils found in the Fruitland/Kirtland Formations are an important part of an almost complete biostratigraphic sequence of events which depict one of the most important episodes in evolutionary history---the transition from domination of terrestrial communities by dinosaurs to domination by mammals. Most fossils found in place in the overburden have the highest potential scientific value because they are generally far more complete and less damaged than fossils that have weathered out into alluvial plains on stream channels. Thus they provide much more valuable information about their evolution and contextual relationship with contemporary paleobiota.

Some paleontological resources in the overburden would likely be damaged or destroyed in some way by the mining process (e.g., blasting, scraping, dragline). These impacts are the most serious type that would occur to paleontological resources, and they cannot be mitigated. The construction of haul and access roads, new railroads, and surface facilities at mine sites would also destroy fossils.

Development of additional coal mines would also produce a population increase in the San Juan Basin. This and the building of additional roads in the EIS Region would permit increased human access to fossil-collecting sites in and near the mine development areas. As a consequence, unauthorized collection and vandalism of fossils would occur.

Despite the above impacts, however, paleontology will realize a certain degree of benefit from implementation of the No Action Alternative, because an excellent opportunity exists to interface paleontologic studies with contemplated mining activities. A cooperative agreement could be made with institutions such as the University of New Mexico and the New Mexico Museum of Natural History to curate the fossils for the benefit of the citizens of New Mexico. During mining, some subsurface paleontologic information that would otherwise be unavailable to the scientific community would become available. Such data would be important for an increased understanding of the life forms and environment of the region during prehistoric times. However, reclamation would limit the time that new exposures are available for continued fossil yields and maintenance of reference sections for future studies. Also, the benefits would be limited because the most significant paleontological resources are small and likely to be destroyed without even being discovered.

A comprehensive discussion of the potential extent of subsurface paleontological resources in the EIS Region is presented in Chapter IV (pages 1-3) of the Star Lake-Bisti Regional Coal Final ES (USDI, BLM, 1979c). The impacts of coal mining on paleontological resources under the PRLAs are treated in Chapter 3 (pages 24-25) of the Environmental Assessment for Coal Preference Right Leasing, New Mexico (USDI, BLM 1981a). Table 3-3 shows that under the No Action Alternative, an estimated total of 1,100 fossil localities would be disturbed.

SOILS

Soils would be temporarily disturbed on 25,000 acres as a result of mining and related activities, including community development. Enforcement of existing regulations would preclude significant adverse impacts pertaining to soil erosion and reduction in soil productivity on reclaimed areas. Reclamation of soils disturbed by off-road recreation vehicles would not be the responsibility of the mining companies so the disturbance would constitute an adverse environmental impact where ORVs are used indiscriminantly. After reclamation, many of the sites that were disturbed for mining would have erosion rates less than the present due to slope modification, erosion control structures, and revegetation.

RECLAMATION POTENTIAL

Actual revegetation experience in the San Juan Basin is limited primarily to the San Juan and Navajo coal mines. Over time, the revegetation efforts at these mines have improved to the point where they have been establishing adequate plant cover. While this benchmark has been achieved to a certain degree, revegetation has not existed for sufficient time to evaluate fully whether the reestablished vegetative community will be capable of self-regeneration and plant succession; and long term plant diversity is questionable. In addition, since the lands have not been subject to grazing pressure, their tolerance for grazing use is uncertain. Additional research over 5 or more years will be needed to have actual data upon which to evaluate these factors. In the interim, the scientific community has expressed some disagreement over the expectation of the future success of the new vegetative communities.

TABLE 3-3

ESTIMATED TOTAL OF FOSSIL LOCALITIES AND TOTAL ACRES DISTURBED BY ALTERNATIVE

Alternative	Total Acres Disturbed	Estimated Total Number Fossil Localities Disturbed
No Action ^{a/}	25,000	1,100
Preference Right Lease Issuance ^{a/}	22,020	1,137 (Known)
Bypass ^{a/} (8 tracts)	6,130	271
Minimum Surface Owner Conflicts ^{a/} (11 tracts)	19,302	136
Target ^{a/} (24 tracts)	35,977	1,400
High ^{a/} (39 tracts)	68,641	1,693

Note: ^{a/} Impacts are attributable solely to this particular alternative and/or action.

Two mines in the San Juan Basin have been formally evaluated to determine whether revegetation is technologically and economically feasible under current regulatory standards: the Burnham Mine and the Gateway Mine. In 1979 the Office of Surface Mining approved a permit for revegetation of the Burnham Mine on the Navajo Reservation. The OSM concluded that if certain procedures were followed during reclamation, revegetation was technologically and economically feasible (OSM, Mining and Reclamation Plan, 1979). It placed a 7-year limitation on mining due to the uncertainty of available data on diversity and plant succession. This decision was challenged in court and upheld.

In 1982 the State of New Mexico concluded that revegetation at Sunbelt Mining's Gateway Mine was technologically and economically feasible (State of New Mexico, Conclusions of Law, 1982). The Gateway Mine presented unusually difficult revegetation problems because such a large proportion of the land overlying the coal at the mine is sandstone, and only a small proportion is suitable topdressing material.

The past experience in the San Juan Basin with revegetation is generally applicable to the lands subject to coal leasing and leads to the conclusion that revegetation on all leases will be technologically and economically feasible assuming:

1. Subsequent experience confirms current revegetation success trends.
2. Acquisition of additional site-specific information on soils, water availability, and related factors at the permit stage do not uncover new or unusually unfavorable combinations of unfavorable characteristics, such as high soil toxicity combined with inadequate availability of alternative topdressing material.

Overall, while revegetation could succeed in the region a worst-case analysis is required in order to establish what will happen if reclamation is not effective. It is possible that some of the lands affected by surface coal mining would be made incapable of retaining a vegetative cover. This would result in erosion, increased air pollution, increased sediment loads, reduction in water quality, loss of soil productivity, and decrease in economic returns from livestock operators. The worst case is not likely for all but a small amount of the land which may be affected by mining.

In the normal situation, the vegetation destroyed by surface coal mining operations will begin growing within 1 year after the overburden and topsoil has been replaced, and will become established within 2 to 3 years. Vegetation will also be fenced for 6-10 years to protect new growth from grazing. At that time, the lands would be restored to grazing use for 2 years. If at that time the vegetation cover cannot sustain grazing pressures, it would again be protected from grazing for additional years until it was thought that grazing could resume. Not sooner than 10 years after the last added seeding, fertilization, or irrigation, would the lands be finally evaluated for revegetation success. If revegetation was successful, the lessee's revegetation bond would be returned, and the lands would be restored to full, normal use. If revegetation was not successful, all or part, as needed, would be replanted either by the lessee or under bond forfeiture proceedings.

The cost of acquisition for more detailed information on soil characteristics and particular revegetation regimes that should be followed to maximize revegetation on each competitive and PRLA tract would be exorbitant. It is not necessary, however, for a reasoned decision since, detailed surface mining act regulations governing revegetation will control whether and how mining will be allowed. Each person that receives a lease does so knowing that mining could be disallowed in whole or part if regulatory requirements are not met.

WATER RESOURCES

Surface Water

The specific impacts on surface-water resources for an individual coal tract cannot be adequately evaluated given the existing information; however, the impacts can and will be addressed on a site-by-site basis during the evaluation of the applicant's mining and reclamation plan and prior to the granting of a permit to mine. The following description of general impacts is based on the assumption that the mine operators will comply with the regulations of the New Mexico Coal Surface Mining Commission (CSMS, Rule 80-1, Section 20-41 and subsequent sections) and other applicable State and Federal regulations.

In general, the potential impacts on surface-water resources are far less significant than the impacts on ground-water resources. As with revegetation, the cost of gathering additional site-specific information is exorbitant, and is not necessary to a reasoned leasing decision due to specific and strict requirements.

Surface Water Quantity

The major impact on surface-water resources would be the destruction of natural drainage patterns by the removal of the overburden in the mined areas. Any existing stock tanks and playa lakes would also be destroyed. Surface runoff and streamflow that originate upstream from the mined areas would be diverted around the areas unless the mine operator obtains water rights. Runoff from precipitation falling on the disturbed areas would generally be impounded behind retention dams. Most of the impounded water probably would evaporate; sediments would tend to settle on the bottom of the pool and thus reduce infiltration into the soil. The decrease in area contributing surface runoff would reduce streamflow and recharge to the alluvium downstream from mining operations; however, the discharge of water from mine dewatering (treated to comply with effluent regulations) could cause increased flow and recharge downstream from underground mines. Extensive ground-water withdrawals at mines and the resulting loss in hydraulic head could slightly decrease ground-water discharge to the San Juan River, and thus decrease flow, and reduce spring discharge from the Chuska Sandstone.

Changes in the amount of runoff from mine areas after reclamation would be dependent on the degree to which topography and water infiltration rates are changed. In general, the combination of the reduction of steep slopes, the elimination of badland areas, and the increase in surface permeability caused by the addition of planting medium and the establishment of vegetation would tend to decrease runoff volumes.

Shown and others (1981) evaluated the potential impacts of surface mining and reclamation at Tsosie Swale, a small basin in the Chaco River drainage. Estimates of peak streamflow and runoff volumes following reclamation were 30 to 70 percent of the premining estimates.

Surface Water Quality

The New Mexico Surface Coal Mining Commission Regulations require the use of the best available technology in the design, construction, and maintenance of diversion structures, sediment ponds, and treatment facilities to prevent or minimize adverse changes in water quality. In no case shall Federal and State water quality statutes, regulations, standards, or effluent limitations be violated (Section 20-41 (c)).

During mining, streamflow originating upstream from the disturbed area generally would be diverted around the area; thus, the quality would not be affected. Surface runoff from the disturbed areas would be impounded in sediment ponds and either evaporate or be treated to comply with appropriate regulations before release to a stream channel. After mining, the sediment ponds and treatment facilities would be maintained until the disturbed area has been reclaimed unless the mine operator can demonstrate that the runoff from the mined area is of as good as or better quality than the water entering the mined area.

Data about water quality following mining and reclamation are very limited. The data available are from reclamation plots at the San Juan Mine near Waterflow and the Navajo Mine near Fruitland (Appendix Table B-10). The analyses are from samples of surface runoff collected immediately downslope from the plots; it is not known if the runoff reached any stream channels. The concentrations of most chemical constituents were well within the ranges present in streamflows. The pH values generally were slightly lower and some trace element concentrations were higher than average values. The April 1982 samples from the San Juan plots had much greater than normal concentrations of some constituents. Presumably the precipitation was of sufficient intensity to expose spoils to runoff.

The most significant potential impact of surface mining and successful reclamation on water quality would be a decrease in the sediment yield of the disturbed areas. The same factors responsible for decreasing surface runoff (see preceding section) would tend to decrease the amount of sediment these areas contribute to stream flow. In their evaluation of potential mine tracts, Summer (1981) and Shown and others (1981) provide detailed discussions leading to their predictions of significant reductions in sediment yield following mining and reclamation.

The preceding description has addressed the general long-term impacts of mining and reclamation. The possibility of short-term, though very significant, impacts also exists. Occasional accidental spills of large quantities of fuel oil or gasoline at the mining operations could occur and cause serious contamination of surface-water supplies. Precipitation events exceeding the specified design criteria for impoundments and diversion structures could cause very large peak flows of water containing abnormally high concentrations of chemical constituents and suspended sediments.

Ground Water Quantity

Continuing development of coal under this alternative would result in a ground-water pumpage of about 3,600 acre-feet per year in 1987 and would increase to a peak-use of about 7,800 acre-feet per year by 2000. Water rights applications (on file at the New Mexico State Engineer Office) indicate that much of the water will come from three major aquifers, the Entrada Sandstone, Westwater Canyon Member of the Morrison Formation, and Gallup Sandstone. Smaller amounts of water will come from more minor aquifers such as the Point Lookout, Cliff House, and Pictured Cliffs Sandstones.

Generalized impacts of surface coal-mining to ground-water resources are described below. These impacts are similar for all alternatives. The nature of the impacts do not change. The severity of the impact is a function of the scale of the mining.

Surface mining of coal beds would disrupt several aquifers in the San Juan Basin. As mining proceeds through alluvial channels, local sources of shallow ground water would be destroyed. Once these areas are reclaimed, less runoff and therefore less recharge may be available to ground water in the alluvium. However, this impact would be very localized.

Surface mining would destroy the stratified nature of the overburden as well as the coal seam itself. Although not important regional aquifers, the geologic units in the overburden do yield water locally to wells.

Depending on the location of a particular mine, the coal-bearing zones are directly underlain by regional sandstone aquifers (Gallup or Dalton Sandstones, for Crevasse Canyon Formation mines; Point Lookout Sandstone, for Menefee Formation mines; or the Pictured Cliffs Sandstone, for Fruitland Formation mines). These sandstones would not be completely destroyed by surface mining, but well yields could be affected locally, for the life of the mine or longer through drawdown of water levels. If dewatering of underground mines were required, water yields from wells completed in these units would decrease. Each ground-water withdrawal would create a cone of depression near the well and lower the water level in the aquifer(s) tapped.

All wells located in areas to be mined would be destroyed, regardless of the aquifer tapped. However, Section 9-21 (a) (3) of the New Mexico Surface Coal Mining Regulations requires that mining companies either protect or replace existing water sources, thereby mitigating adverse effects on existing users.

Mining companies would obtain most water to be used for operations, dust control, and reclamation from "deep" aquifers beneath mines. Any company wishing to appropriate ground water in the EIS area must submit an application to the New Mexico State Engineer. These applications identify aquifers to be tapped and quantities of ground water to be used per year. The applications are subject to protest by senior ground-water users in the area. The State Engineer carefully analyzes the impacts of each ground-water withdrawal before issuing a permit to appropriate the water. He has the option to approve, modify, or deny any application. The State Engineer is currently considering applications only from mining companies holding PRLAs and existing leases, thereby mitigating adverse effects on existing users.

The State Engineer requires protection or replacement of existing wells by the applicant. New Mexico Surface Coal Mining Regulations (Section 20-54) require compliance with any water-replacement plan approved by the State Engineer.

Ground Water Quality

The coal beds of the Crevasse Canyon, Menefee, and Fruitland Formations commonly have overburden of shales, carbonaceous shales, siltstones, and sandstones; they are commonly underlain by shales.

During mining, the stratified nature of the overburden would be destroyed. Following mining, the mixed and crumbled overburden would be placed back into the pit and regraded. This mixed overburden would have a porosity greater than the original stratified material and would act as a single homogeneous aquifer overlying either the Gallup or Dalton Sandstones (for Crevasse Canyon Formation mines), the Point Lookout Sandstone (for Menefee Formation mines), or the Pictured Cliffs Sandstone (for Fruitland Formation mines).

Van Voast, and others (1977) studied the effects of coal surface-mining on ground-water quality near Colstrip, Montana. These authors found that in the mixed overburden spoil zones the quality of water in younger mined areas was similar to that from nearby, undisturbed aquifers. Spoils from older mined areas contained more highly mineralized water.

Water that resaturated the mixed and crumbled overburden would slowly mineralize and flow downgradient into shallow aquifers. If those aquifers contained water of better quality than that from the spoils, then a water-quality impact would occur. The magnitude of any impact is not predictable at this time for various reasons including unknown quality of water that resaturates the spoils, amount of recharge to spoils, and the type, distribution, and leachability of spoil materials (Woessner, 1979).

The greatest ground-water quality impact would probably be to the alluvial aquifer downstream from a mined area. In the San Juan Basin, water from alluvium is commonly of better quality than that from adjacent coal-bearing rocks. The quality of water in the alluvium could be reduced by seepage from spoils and subsurface flow. Any bedrock aquifer (Gallup, Dalton, Point Lookout, Pictured Cliffs Sandstones) connected to a spoils area could also be impacted in a similar manner.

VEGETATION/LIVESTOCK GRAVING

Change from a principally grazing and ranching scenario to mining and support uses is expected to occur. This would occur during the construction and production phases of existing state and federal leases, proposed mines under contract commitments or mine plans and other federally approved projects.

Land changes from grazing to mining and support uses could eliminate livestock grazing on such lands until reclamation is complete. Due to variability of grazing numbers, land ownership and seasons of use in the EIS region, any actual AUM losses can only be estimated and are shown in Table 3-4.

TABLE 3-4
VEGETATION, AUMs, AND LIVESTOCK IMPROVEMENTS IMPACTED
BY ALTERNATIVE

Alternative	Vegetation Removed (Acres)		Forage Removed (AUMs)		Livestock Improvements (Total)
	1987	2000	1987	2000	
No Action	8,000	16,000	1,052	2,105	Unknown
Preference Right Lease Issuance	651	9,113	58	819	10 Reservoirs 21 Miles of Fence 3 Cattleguards 2 Corrals 4 Wells
Bypass <u>a/</u>	494	897	43	82	4 Reservoirs 2 Miles of Fence 1 Well
Minimum Surface Owner Conflict <u>a/</u>	638	2,180	114	455	9 Reservoirs 13 Miles of Fence 6 Wells 1 Spring
Target <u>a/</u>	1,819	4,563	257	730	15 Reservoirs 31 Miles of Fence 9 Wells 1 Spring
High <u>a/</u>	3,771	8,863	490	1,230	28 Reservoirs 73 Miles of Fence 1 Corral 17 Wells 1 Spring

Note: a/ In order to determine cumulative impacts for a particular alternative include the impacts from new coal leasing plus the impacts of coal leasing from the No Action Alternative and PRLA Lease Issuance.

Livestock grazing would be temporarily lost on approximately 25,000 acres for the life of the mine or until reclamation is complete which could be an additional 5-15 years. The actual availability of the reclaimed area for grazing would depend upon the procedures and time frame specified for reclamation in a mine plan and the success of the procedures used to reclaim the area. These acres and AUM figures represent less than one percent of the total found in the EIS region.

The lowering of water levels in aquifers due to exploration and production activities could reduce livestock water resources used by Navajo livestock. If water is used in large enough quantities water levels could also be lowered, thus reducing water resources for livestock and farming on the Jicarilla Reservation. These activities could also destroy water impoundments used by livestock.

Congestion caused by new developments and increased traffic in the coal region would result in a greater hazard of vehicle collisions with migrating livestock, and make moving livestock to and from grazing use areas difficult. Ranchers may also have to acquire additional feed to prevent reductions in livestock numbers on private offtract areas during seasons of non-use on the tract areas. The proportion of land affected by mining to the total land available for grazing in the region is small (<1%). No significant regional effect is expected.

WILDLIFE

All wildlife species and their habitats were analysed and the impacts to these species were not determined to be major. Therefore, discussion of these species and their habitats will not be further addressed in this document.

Species of High Federal Interest

Increased human activity associated with construction of surface facilities and coal mining could disturb, through harassment, migrating, wintering, or nesting prairie falcons, ferruginous hawks, and golden eagles. It is not known which, if any, or how many of the nests would be deserted or destroyed. No density figures for these raptors are available, however golden eagles occur in large enough numbers at any time of the year to be considered common residents. Shooting of raptors may become a significant factor in areas where powerlines would follow roads. For example, within the Navajo Agricultural Products Industries facilities just south of Farmington, wintering raptors concentrate in irrigated fields. Suitable perches in the form of powerlines follow many of the roads and during winter months as many as two dead raptors per mile may be counted under power poles as a result of shooting. These losses will increase due to expected development but are not expected to be substantially greater than current losses.

The nesting season would be the most critical season, with harassment at nest sites an additional problem. Generally, for prairie falcons, ferruginous hawks and golden eagles, disturbance early in the nesting cycle (February-May) would result in some nest desertion, with a few birds attempting to re-nest. Human intrusion later in the nesting season when nestlings are being cared for would result in somewhat less nest desertion, although

productivity of the raptor population as a whole would suffer. No direct effect from mining is expected due to protective lease terms and federal laws.

THREATENED OR ENDANGERED SPECIES

In addition, T & E surveys would be required at the mine plan stage. Should any evidence be found concerning T & E species the consultation process would resume and appropriate steps taken to insure no jeopardy to the continued existence of any endangered species.

CULTURAL RESOURCES

There are 470-950 cultural sites predicted to occur under this alternative. Salvage excavation of threatened archaeologic or historic sites may be required. Data would be preserved, but sites or portions of the sites would be lost.

Some loss would occur for buried sites encountered during dirtmoving operations even if they were recognized early. Changes in the setting of sites, either by the introduction of project activities and facilities or by moving facilities to avoid impacts, would degrade archaeologic and historic values. Vandalism impacts would occur due to an increased population and easier accessibility.

Positive impacts would also result from coal development. Valuable information has been gathered and other surveys could be necessary prior to any disturbance. The additional surveys would result in the accumulation of data that would otherwise not have been available until the future, or which may have been lost. Any salvage excavation that is required will result in the preservation of data and material (including some that might otherwise be lost to vandalism), although in situ value is lost.

VISUAL RESOURCES

More urbanization would occur in existing communities; improved or extended access roads and secondary ancillary facilities would be needed. In some cases the visual character of smaller outlying communities would be changed from rural agriculture to one of more urbanization. Some secondary visual resource degradation would be caused by dust from increased industrial activities, and by indiscriminant increases in ORV use, littering and vandalism. In addition, road construction and utility line construction would introduce strong axis lines which would change the natural landscape character. To some individuals, this would detract from the enjoyment of viewing the landscape; to others, new roads would provide additional access to scenic enjoyment (USDI, 1981).

WILDERNESS

Existing coal lease NM-0186615 and the southern portion of NM-0186612 are in close proximity to the Bisti WSA. The sights and sounds associated with

surface mining of these leases could disrupt the wilderness characteristics of naturalness and opportunities for solitude in this WSA. Objectionable sounds could include sirens and noises from blasting, operation of equipment, and transportation. Visual effects could result from the viewing of mining structures and operations from within the WSA, lighting of the sky during night operation, and decreased visibility due to the dust produced by mining. The impacts of mining on the Ah-shi-sli-pah WSA, if it is not designated as a wilderness area, are discussed under the PRLA Issuance Alternative. Similar impacts to mining the De-na-zin WSA would occur. However, if the De-na-zin WSA is not designated as wilderness it will be designated as an Area of Critical Environmental Concern (ACEC) as approved in the Chaco Management Framework Plan. The Bisti WSA falls under the same situation, but with additional measures being taken to ensure that mining does not occur within the WSA boundaries.

Secondary or indirect impacts (overcrowding, loss of solitude, serenity) are expected to occur on all of the WSAs under the No Action Alternative. These impacts would result from increased use of the WSAs by an influx of people into the EIS Region. Increased littering, vandalism of scientific and educational values (paleontological and cultural), and off-road vehicle use are anticipated. A Wilderness Management Plan, which would be prepared after Congressional designation, would identify the necessary visitor management actions needed to preserve the wilderness character of the areas.

Other projects that could be expected to affect wilderness resources include the Star Lake-Bisti Railroad and the Fruitland Coal Load Transmission Line. Noise from the railroad would be audible in the Bisti and Ah-shi-sle-pah WSAs, and the transmission line would be visible from within the Ah-shi-sle-pah WSA.

RECREATION

Increased population associated with coal mining and related industries in the EIS Region would result in increased participation in hunting, hiking, fishing, camping, water skiing, float boating, ORV use and sightseeing, thus causing more pressure on the area's recreation resources. Among the places receiving more use would be Navajo Lake, the San Juan River, the Chaco Culture National Historical Park, Angel Peak, and the Ah-shi-sle-pah, De-na-zin and Bisti WSAs. It is possible that some increase in recreational use would occur in the Jicarilla Apache Reservation, but it is expected to be minimal. Overcrowding could become a problem at some of these areas. Increased litter, vandalism, and damage resulting from ORV use could occur due to an increase in population.

Roads in many of the mining areas will be improved, thus allowing increased access to recreation attractions. Some people could find coal development interesting, adding to their recreational experience.

Noise from the Star Lake Railroad would distract from the recreation experience in the Bisti Management Area, the Chaco Culture National Historical Park, and possibly the CDNST.

An exact determination cannot be made of the amount of acreage removed from dispersed recreation use in any given year as a result of the

various projects, but it is expected to be a very small percentage of the total recreation acreage available. However, nearly 25,000 acres would be unavailable for dispersed recreation for the life of the mine.

LAND USES

(Roads, Railroads, Pipelines, Transmission Lines)

The total acreage of rights-of-way for roads, powerlines, natural gas pipelines, and railroads and other projects are unknown. An unknown number of acres of these facilities rights-of-way would be disturbed by having to relocate the facilities to other areas.

Natural gas pipelines could be jeopardized by subsidence fracturing the lines. Leakage in high pressure gas lines could create a safety hazard, and could disrupt service to customers. Subsidence could cause some change in wire tension and create safety hazards with sagging power lines. Power lines are required to be of a specified tension to conform to regulations. Existing lease requirements should be effective in preventing these kind of occurrences.

Other land uses such as livestock grazing and recreation are discussed in those sections of this chapter.

TRANSPORTATION

Table 3-5 shows predicted increases in car and light duty truck traffic due to the development of coal and other projects in the EIS Region. Increases were projected for the years 1987 (start-up) and 2000 (peak production).

The largest increase in average daily traffic would occur along two major routes connecting the tri-city area of Farmington, Aztec, and Bloomfield. One route includes segments of New Mexico 44 and New Mexico 57, and the other route is NM 371.

The highways listed in Table 3-5 are the major arteries to access the coal region but other public roads (e.g., county and Bureau of Indian Affairs) are located in the vicinity. The No Action Alternative would add about 332 vehicles per day (vpd) to highways in the area by 1987 and about 387 vpd by the year 2000. This increase can be compared to the existing average vpd in Chapter 2 (refer to Table 2-11).

Increased noise, air pollution, traffic accidents, road congestion, maintenance and construction, and animal road kills could result from an increase in traffic. Because most of the rangelands are not fenced, additional traffic on these roads could result in an increase in the number of accidents involving livestock.

The increased number of accidents projected as a result of the additional traffic from mining under the No Action Alternative is listed in Table 3-6. Increases would occur on New Mexico 44 and New Mexico 371 in 1987 and the year 2000.

TABLE 3-5

PROJECTED ANNUAL AVERAGE DAILY TRAFFIC (ADT) INCREASES
ON HIGHWAYS IN THE EIS REGION BY ALTERNATIVE

Alternative	NM 32 a/ 1987	2000	I-40 b/ 1987	2000	NM 44 c/ 1987	2000	NM 53/344 d/ 1987	2000	NM 57 e/ 1987	2000	NM 170 f/ 1987	2000	NM 197 g/ 1987	2000	NM 371 h/ 1987	2000	NM 509 i/ 1987	2000
No Action ^{h/}			8,337	8,386	5,184	5,186					3,584	3,585			+16	+19		
Preference Right Lease Issuance ^{h/}									2,275	3,535			+6	+158	+84	+1,344	+16=	+
Bypass ^{h/}											2,307	3,637		+26	+19	+52		
Minimum Surface Owner Conflicts ^{h/}									2,225	2,741	3,637	4,104		+26	+19	+52	+39	+505
Target ^{h/}									2,225	2,844	3,637	4,104	+31	+175	+79	+294	+39	+505
High ^{h/}	1,559	1,823	8,060	8,471	5,189	5,808	3,985	4,521	2,225	2,844	3,642	4,186	+31	+338	+167	+752	+62	+598

Notes:

a/ 1980 Baseline = 1,541 ADT

b/ 1980 Baseline = 8,055 ADT

c/ 1980 Baseline = 5,155 ADT

d/ 1980 Baseline = 3,923 ADT

e/ 1980 Baseline = 2,191 ADT

f/ 1980 Baseline = 3,579 ADT

g/ 1980 Baseline = No traffic surveys were completed for 1980.

h/ Impacts are attributable solely to this particular alternative or action.

TABLE 3-6

PROJECTED TRAFFIC ACCIDENT INCREASES ON HIGHWAYS BY ALTERNATIVE

Alternative	New Mexico 32 <u>a/</u>		New Mexico 44 <u>b/</u>		New Mexico 197 <u>c/</u>		New Mexico 371 <u>d/</u>	
	1987	2000	1987	2000	1987	2000	1987	2000
No Action				289			73	73
Preference Right Lease Issuance ^{e/}	—	—	289	308	—	—	76	141
Bypass ^{e/}	—	—	288	290	—	—	73	75
Minimum Surface Owner Conflicts ^{e/}	—	—	289	296	—	—	73	75
Target ^{e/}	—	—	289	298	18	22	77	90
High ^{e/}	48	49	289	298	18	28	82	113

Notes: a/ 1980 Baseline = 47 Accidents
b/ 1980 Baseline = 288 Accidents
c/ 1980 Baseline = 17 Accidents
d/ 1980 Baseline = 72 Accidents
e/ Impacts are attributable solely to this particular alternative or action.

SOCIAL AND ECONOMIC FACTORS

Development expected in the Region without competitive coal leasing would generate substantial change. Table 3-7 shows the estimated level of change for the factors most likely to be additionally impacted by competitive coal development.

Employment is estimated to show baseline increases (no competitive leasing or PRLA Issuance) ranging from 12 percent in the Crownpoint-Thoreau area to 60 percent for the Cuba area for 1987. Year 2000 baseline increases are estimated to range from 27 percent for Crownpoint-Thoreau to 173 percent for Cuba.

Population increases are expected to follow the pattern of employment with low percentage increases in the Crownpoint-Thoreau area and high percentage increases occurring in Cuba.

The increase patterns are shown for other factors that increased substantially under baseline development. These factors include housing needs, community expenditures, water use and wastewater treatment. The village of Cuba will have substantial increased needs for nearly all services because they are expected to have a rapid and substantial population growth even under the baseline projections.

AMERICAN INDIAN CONCERNS

Impacts to the Jicarilla Apaches as described below for the Navajo could occur but it is felt that because of their location, being removed from the natural area of mining, that if they were affected it would be minimal.

Impacts on the values, beliefs and lifestyles which influence subjective quality of life of the Navajo are difficult to assess. Experience has shown that a large number of adverse health effects will occur as a result of this alternative. In two areas of Colorado and Wyoming which underwent a similar sort of energy resource development, several measures of health deteriorated strikingly.

Injuries to children from child abuse and neglect increased three times faster than the population did during the period of energy development; injuries to wives from spouse abuse also increased three times faster than the population. Admissions to mental health hospitals increased ten times faster than the population during this period. Measures of alcohol and drug abuse effects on health increased fifteen times faster than the population, and injuries from assaults increased twenty times faster. It should be noted also that the studies in Colorado and Wyoming did not examine increases in injuries due to vehicular accidents. (Davenport, 1980).

While the data came from areas where the population was culturally and ethnically uniform, the development of the San Juan Basin will result in ethnic and cultural clashes. The result will be increases in a variety of mental stresses and an increase in the disease measure just referred to.

The effects on health are likely to be worse for reasons that are unique to the area. Relocation of Navajo families from homesites that they have occupied for generations will markedly increase incidences of mental illness, as it has elsewhere where Navajos have been relocated. This could affect up to 22,000 Navajos who may have difficulty, pursuing their traditional lifestyle.

The destruction of gravesites and sacred sites, and violation of the land will make matters worse and cannot be absolved simply by traditional ceremonies. The Navajos in the area that have low, relatively fixed incomes are not likely to benefit economically from the development, and yet they will likely suffer from price inflation accompanying the boom. This situation will be another aggravation of mental illness. All of these will affect both those directly involved in the development, and those "bystanders" living in the region. The end result will be a dramatic increase in measures of alcoholism, accidents, injuries from assaults, and mental illness. (Davenport 1980).

To summarize, the No Action Alternative will result in adverse effects on the health of the people of the area. The Crownpoint Service Unit, a Division of the Indian Health Service which provides the health care for about 17,000 Navajos living in a 3,500 square mile area of the San Juan Basin, is already overburdened and will be unable to adequately meet the increased need.

Access to portions of grazing use areas extending outside mine areas could be disrupted by mining operations. Rotational grazing practices could be interrupted for livestock operators losing use of a seasonal range. Some range outside mine areas could become unusable by livestock due to a decrease in the quantity and quality of available water.

As a general estimate, 20-40 years could elapse between the time an area was opened up by surface mining until grazing could be resumed. The actual availability of the reclaimed area for grazing would depend upon mine plan operation.

The local market for silver jewelry and for rugs could expand with the population growth of non-Indians. However, weavers displaced from mine areas could be forced to find new gathering areas for minerals and plants used in cleaning and dyeing wool. Weavers unable to maintain flocks of sheep and goats may have to purchase wool.

Removal of natural vegetation during surface mining could force traditional religious practitioners to seek new plant and mineral gathering areas for ceremonial use. The religious ceremonies may be totally destroyed if new gathering areas are not found. The seeds for many species may be very costly or may not be commercially available for inclusion in reseeding mixtures used by coal companies.

An area of possible positive impacts for the Navajo people is in the financial or economic sector, where jobs with higher income would be available. Jobs in mine construction and operation could partially reduce the current high rate of Navajo unemployment. The availability of highly paid mining jobs could improve the standard of living within extended families. Navajos now holding wage jobs in other locations may be able to find employment near their local residence groups. Tribal and racial rivalries could increase as Navajos from other areas, members of other tribes, and non-Indians compete with local Navajos for employment.

TABLE 3-7

BASELINE (NO ACTION) LEVELS FOR ECONOMIC AND SOCIAL FACTORS
1987 and 2000 WITH PERCENTAGE CHANGES FROM 1980

Economic or Social Factor	Farmington 1/		Cuba		Grants		Gallup		Milan		Crownpoint/Thoreau	
	1987	2000	1987	2000	1987	2000	1987	2000	1987	2000	1987	2000
Employment	27,440	32,020	1,992	2,154	12,118	17,148	6,700	7,892	1,855	2,630	764	933
% Change from 1980	25	46	59	72	1	43	21	42	19	68	12	27
% Change from 1980			313	535	5,680	8,038						
			60	173	17	66						
Housing Needs	19,200	22,450	314	537	9,551	13,516	7,351	8,631	5/	5/	668	816
% Change from 1980	16	36	16	99	82	157	13	33			6	30
Community Expenditures (\$000)	71,876	83,980	485	829	16,572	23,478	4,684	9,368	5/	5/	NA	NA
% Change from 1980	27	49	60	174	25	77	21	42			7/	7/
Water Use (Acre Feet)	745	4,413	94	412	233	1,820	124	711	5/	5/	5	266
% Change from 1980	5	27	26	115	8	6	5	26			<1	26
Wastewater Treatment (000 Gallon/Day)	2,835	5,080	43	124	253	776	227	463	5/	5/	16	50
% Change from 1980	27	48	60	173	25	78	21	42			12	37
Population	13,738	25,188	361	1,049	2,863	8,880	3,747	7,647	945	2,907	267	817
% Change from 1980	25	46	59	172	25	78	21	42	25	78	12	37

Note: 1/ Includes Farmington, Aztec, Bloomfield, and Associated Communities

2/ County Census Division Figures.

3/ Village of Cuba Figures.

4/ City of Grants Figures.

5/ Includes Grants and Milan.

6/ Included with Grants.

7/ Not Available.

8/ Estimated based on maintaining the expenditures at the 1980-81 per capita levels.

NONCOMPETITIVE COAL LEASE ISSUANCE

IMPACTS - PREFERENCE RIGHT LEASE ISSUANCE

This section addresses the environmental effects of (1) mining the 26 pending PRLAs with the currently proposed lease terms and conditions (Appendix I-2), and the Committed and Additional Mitigating Measures that significantly mitigate regional environmental impacts; this is the preferred alternative and (2) exchanging the PRLAs for coal bidding rights or seeking legislation to transfer the rights obtained under PRLAs for other mineral rights. The alternative of withdrawing these lands is not discussed because the rights of a PRLA are such that a withdrawal would have no effect on leasing, since a withdrawal must be made subject to a PRLA holders valid existing rights.

The Department's regulations (43 CFR Part 3430) require PRLA holders to show they are entitled to leases by submitting a "final showing" which demonstrates that a prudent person would expend time and money to develop a mine with a reasonable expectation of making a profit, including consideration of the costs of complying with lease terms. Costs of complying with proposed lease terms is considered in the final showing process.

The Bureau has asked for and received a preliminary final showing from each of the 26 PRLA holders. The request for this showing expressly reserved to the United States the right to change any or all of the terms in that request after considering the environmental analysis and alternatives in this statement. The Bureau will request a final showing for each of the 26 PRLAs based upon the results of this EIS.

AIR QUALITY

Two air quality analyses were performed to provide input for this EIS. The first, by Pedco (1982), was a screening analysis to determine the air quality impacts of mining on each of the proposed competitive lease tracts and the PRLAs. The study first assessed each tract individually to determine significance of the impacts. A preliminary analysis was then performed to determine the cumulative impacts of proposed mines in close proximity to other mines. Results of the analysis indicated three areas (Bisti, Crownpoint to Lee Ranch East, and Gallup) showed potential problems and needed further analysis.

This further analysis was done by ECOS Management Criteria, Inc. (1982). ECOS used a computerized regional dispersion model to determine ambient concentrations of total suspended particulates (TSP) resulting from coal mining and transportation for each of the alternative levels of mining. Information regarding dispersion models, meteorological data and methodology can be found in Appendix G of this EIS. More detailed data is located in the technical reports done by Pedco and ECOS, copies of which are available in the Farmington Resource Area Office.

The development of the PRLAs is estimated to result in the emission of 3,542 tons of total suspended particulates (TSP) per year. The resulting

24-hour ground level concentration of 100 ug/m^3 is shown in Table 3-1. The concentration does not exceed any of the New Mexico or National Ambient Air Quality Standards (NAAQS).

The frequency of occurrence of the 24-hour maximum value could not be determined with this analysis. The frequency of occurrence is influenced by the amount of emissions from automobiles and industry and the atmospheric conditions of a particular day. More realistic 24-hour impacts could be obtained using a short-term model and appropriate 24-hour meteorological data when more detailed mine site information is developed at the mine-plan stage. As seen in Appendix G, the TSP concentrations are limited in spatial extent (beyond the coal lease boundaries), as would be expected of larger particles resulting from mining activities. The annual average concentration values are generally more appropriate for determining regional impacts. The 24-hour maximum was estimated from the annual values by the Larsen transformation method. Since the 24-hour value is considered a conservative value, it should be viewed with caution.

A Class II area, the Chaco Culture National Historical Park, was examined to determine if the TSP levels allowable under the PSD regulations would be exceeded. The increased TSP levels would be below the applicable Class II increments. The two Class I areas in closest proximity to the PRLA and competitive lease tracts (Mesa Verde National Park and the San Pedro Parks Wilderness) were also examined. The calculated TSP levels were significantly below the allowable Class I increments.

Fugitive dust particles suspended in air can cause a reduction in visual range as a result of the scattering of light. An approximate assessment of reduction in visual range from this alternative was made using the approach of Ursenbach (1978). Assuming an annual background concentration of 30 ug/m^3 , the visual range would be reduced from 73 to 67 miles (by 8 percent). Short-term (24-hour) concentrations would result in a reduction of visual range to 32 miles, a decrease of 56 percent.

Using the 73 miles of visibility calculated above for the Chaco Culture National Historical Park, visual range reductions would be 3 percent on an annual basis and 18 percent on a short-term, 24 hour basis.

Based on the use of the NAAQS and PSD standards as a measure of significance, the calculated increased TSP concentration from this alternative would not result in a significant air quality impact. According to the New Mexico Environmental Improvement Division the PSD baseline has been triggered. This means a baseline has been established and new projects must apply for a permit to utilize any of the remaining increment, (the remaining increment is defined as the difference between the baseline and the maximum PSD increment). Permits to consume PSD increment must be obtained from the State of New Mexico. The process for obtaining these permits must follow the procedures to be established by the State of New Mexico, and they will determine who receives the available increment. This could be determined by requiring more advanced technology, by

refusing new permits, or by letting the new projects "buy" increment from a current user, who would then utilize better technology or cease operations.

Since fugitive dust is not included under the current EPA and PSD regulations, it is not anticipated that any of the proposed mines will emit enough emissions to require a PSD permit. Existing air quality regulations and requirements are expected to be effective in controlling air quality problems.

TOPOGRAPHY AND MINERAL RESOURCES

Surface Mining

The type of impacts associated with leasing this action would generally be the same as those identified under the No Action Alternative. Table 3-2 shows that under this action approximately 1500 and 10,000 acres would be disturbed in 1987 and the year 2000, respectively. A total of 22,020 acres would be disturbed by mining, of which 705 acres would be for surface facilities. Total acreage disturbed under this and the No Action Alternative would be 47,020 acres. Impacts to construction materials (sand and gravel) would be of the same type as discussed in the No Action Alternative.

Underground Mining

Underground mining would result in the removal of 50 percent (approximately 241.9 million tons) of the mineable coal beds. The remaining 50% would be unrecoverable under present technology. Underlying coal beds would not be disturbed and could be mined at a later date.

Destruction of the strata immediately overlying the underground mined tracts could occur as a result of subsidence. Subsidence could occur on an undetermined number of acres and would be the result of several variables, including: (1) mining methods (2) overburden thickness and type, (3) production rate and seam thickness, and (4) geometry of mine workings (USDI, MMS 1982). Subsidence would be greatest at the center of the mined-out area and much less in the peripheral areas. Surface expressions of subsidence could include open fractures, buckled and bulged bedrock, sinkholes, and other depressions. Subsidence could cause damage to structures or improvements located on underground mine areas. It could also become a safety hazard to individuals and also to livestock that could wander into the area. Subsurface and surface water sources for livestock could also be disrupted. Required lease conditions and regulations require subsidence to be controlled to prevent these kind of effects and should be effective in doing so.

PALEONTOLOGY

The type of impacts associated with this action would generally be the same as those identified under the No Action Alternative. Table 3-3 shows that under this alternative, 1,137 known fossil localities would be disturbed. The total number of fossil localities disturbed for this and the No Action Alternative would be 2,237. Existing lease term requirements are expected to be partly effective in mitigating effects on paleontological resources. Study and specimen recovery will gather significant information. This kind of mitigation

is relatively new, and current plans could develop practical problems causing loss of scientific data.

SOILS

The type of impacts associated with mining under this alternative would generally be the same as those identified under the No Action Alternative. Surface disturbance at the onset of mining activities (1987) would consist of about 1,500 acres. Approximately 10,000 acres of surface disturbance would occur during peak mine production (year 2000). The total acreage disturbed by this and the No Action Alternative would be 47,020 acres (refer to Table 3-2).

A maximum of 80 acres per underground mine would sustain surface disturbance in the form of access roads, parking areas, storage yards, buildings, utilities, and mine structures. Surface structures and facilities associated with underground mines would result in vegetation removal and soil disturbance and thus susceptibility to wind and water action. Sediment rates would increase slightly because of vegetation removal and unstable soils, and the placement of mine structures and facilities would cause some soil compaction. Soil characteristics and properties (bulk density, permeability, productivity, potential, structure, infiltration rates, and micro-organisms) would be affected to some extent because of soil handling, transporting, and stockpiling. Soil contamination may occur because of accidental spills (man-made products) and toxic material from disturbed soils, bedrock, and spoil piles.

Projected reclamation potential discussed in the No Action Alternative is expected to be similar under Preference Right Lease Issuance. Required lease terms and regulatory requirements are highly effective in ensuring reclamation will be done effectively, and in preventing mining where revegetation is not economically and technologically feasible.

WATER RESOURCES

Surface Water

The general impacts on surface water caused by this action are the same as those described for the No Action Alternative. The nature of the impacts do not change; the magnitude of the impact is proportional to the amount of surface area disturbed. During mining and reclamation, the larger the area disturbed the less the area contributing surface runoff and the larger the decrease in streamflow and sediment. After mining, the larger the area successfully reclaimed the greater the reduction in sediment yield and streamflow. Increases in the number of mining operations may increase the possibility of accidental contamination of surface water and of failure of impoundments and diversion structures.

Ground Water

The type of impacts associated with mining under this action would generally be the same as those identified under the No Action Alternative. The impacts of energy development on ground-water resources of the San Juan Structural Basin are a major concern in this EIS. As such, there is a and the Navajo and Jicarilla Tribe. The degree of conflict depends on the rate of development on the lands and the legal availability of water. In an effort to quantitatively analyze these impacts, the BLM requested the U.S. Geological Survey, Water Resources Division (GS, WRD) to assist by making engineering estimates of changes in the water levels and flows in various aquifers caused by ground water withdrawals.

The analyses were done by computer simulation (digital model of Frenzel and Lyford, 1982). This model and additional information is included in Appendix B-11.

Projected (model-derived) drawdowns for this action are shown on Plate 1 (enclosed with the Draft EIS). Maps on Plate 1 for each major aquifer (Model Layers 1, 3, 5, 6, and 7--refer to Appendix B-11) show drawdowns for the years 1987, 2000, 2020, and 2040. The greatest drawdowns (2,000 feet) would occur in the Westwater Canyon Member of the Morrison Formation (Layer 3) in the year 2020. The year 2040 map for this layer indicates a repressuring (or recovery of water level and inward movement of drawdown contours) in the middle of the cone of depression and continued depressuring (or drawdown of water level and outward movement of contours) near the basin boundary.

Results would be similar for the Entrada Sandstone (Layer 1). The greatest drawdown (600 feet) would occur in the year 2020, with recovery of water level in the basin center and continued drawdown towards the basin boundary in the year 2040.

In the Gallup Sandstone (Layer 5), the greatest drawdown (1,000 feet) would occur in the year 2020 near the Gallup area coal tracts. Drawdown in Layer 6 (Crevasse Canyon Formation) would reach a maximum of 30 feet in the year 2020. Drawdown in Layer 7 (Upper Mesaverde Group Sandstones) would reach a maximum of 300 feet in the year 2000. Maximum drawdown and the years they would occur for this alternative are summarized in Table 3-8. Total water needs for this and the No Action Alternative would be approximately 16,450 acre-feet per year. Monitoring and enforcement of lease terms by the State Engineer should be highly effective in protecting existing water users.

VEGETATION/LIVESTOCK GRAZING

Table 3-4 shows that the Preference Right Lease Issuance would temporarily remove approximately 22,020 acres of native vegetation and 2,041 AUMs of livestock forage on 12 BLM-BIA administered allotments (11%) over the life of the mines. This represents approximately 31 percent of the available forage within the PRLA Lease boundaries. In addition, 10 reservoirs, 21 miles of fence, 4 wells, 2 corrals, and 3 cattleguards would be destroyed by surface mining. By the start of production in 1987, there would be 651 acres of native vegetation removed and 58 AUMs of forage lost. At the peak of mining in the year 2000, there would be 9,113 acres of vegetation removed and 819 AUMs of forage. The total disturbance for this and the No Action Alternative would be

TABLE 3-8
MAXIMUM DRAWDOWN IN MAJOR AQUIFERS OF THE SAN JUAN STRUCTURAL BASIN,
FOR THE PREFERENCE RIGHT LEASE ISSUANCE

Alternative	Aquifer	Maximum Drawdown (Feet)	Year of Occurrence	General Area(s) of Occurrence
No Action	Entrada Sandstone	600	2020	Central Basin
	Westwater Canyon Member	2,000	2020	Central Basin
	Gallup Sandstone	1,000	2020	Gallup Area
	Crevasse Canyon Formation	30	2020	Gallup Area
	Upper Mesaverde Group Sandstones	300	2000	Central Basin

Note: Reference Plate 1, enclosed with the Draft EIS.

to 47,020 acres, 5,198 AUMs, 14 reservoirs, 23 miles of fence, 5 wells, 3 cattleguards, and 2 corrals. This represents 1.6 percent of the AUMs in the Chaco Planning Unit over the life of the mines.

The loss of AUMs would be most severe for individuals whose livestock graze community allotments and have very few AUMs. This loss of AUMs would result in a disruption of the allottee's traditional grazing lifestyle. The individuals who would lose their grazing privileges in one allotment could be absorbed by the allottees in another allotment by proportionally reducing the number of animal units each person would run and allow the individual who lost his or her AUMs to run livestock in their allotment. This could result in severe overgrazing and lead to friction and hostilities among community members. Loss of traditional grazing lands may cause trespass problems in some cases.

If operators were adequately compensated for the loss of forage they could lease pasture land or feed their livestock around their dwelling areas. Mining companies could also provide feedlot for the displaced livestock. Existing statutory protection for federal lessees will provide effective protection for operators.

WILDLIFE

Species of High Federal Interest

Increased human activity associated with mining under this action would have the same type of impacts on migrating, wintering and nesting prairie falcons, ferruginous hawks, and golden eagles that would occur under the No Action Alternative. No density figures for these raptors are available, however golden eagles occur in large enough numbers at any time of the year to be considered common residents. Under this action the nests of one prairie falcon and five ferruginous hawks on PRLAs would be affected by indirect human activities (Table 3-9). The indirect impacts of mining on birds of high federal interest would vary depending on the time of year. Birds would be vulnerable to shooting at any time, usually while perching on fences or power lines along roadsides.

The nesting season would be the most critical season, with harassment at the nest sites an additional problem. Generally, for prairie falcons, ferruginous hawks and golden eagles, disturbance early in the nesting cycle (February-May) would result in some nest desertion, with a few birds attempting to re-nest. Human intrusion later in the nesting season when nestlings are being cared for would result in somewhat less nest desertion, although productivity of the raptor population as a whole would suffer. Lease terms and regulations provide effective protection from damage that might be caused by mining operations.

Through the Section 7 consultation with the USFWS as required under the Endangered Species Act of 1973, and by correspondence with New Mexico Department of Game and Fish (NMDG&F), it was determined that there would be no significant direct or indirect impacts to threatened or endangered species (See Appendix D for documentation of the consultation process).

TABLE 3-9

RAPTOR NESTS AND CRUCIAL DEER AND ELK HABITAT AND ACREAGE DISTURBED BY ALTERNATIVE

Alternative	Acreage Disturbed <u>a/</u>		Total Number of Nests <u>b/</u>
	1987	2000	
No Action			Unknown
Preference Right Lease Issuance <u>c/</u>	—	—	1 Prairie Falcon 5 Ferruginous Hawks
Bypass <u>c/</u>	160	200	1 Ferruginous Hawks
Minimum Surface Owner Conflicts <u>c/</u>	160	200	1 Golden Eagle
Target <u>c/</u>	160	200	2 Ferruginous Hawks 2 Golden Eagles
High <u>c/</u>	212	200	2 Ferruginous Hawks 2 Golden Eagles

Note: a/ Crucial Deer and Elk Habitat.

b/ Nests of Species of High Federal Interest.

c/ Impacts are attributable solely to this particular alternative and/or action and are based on tract specific information.

CULTURAL RESOURCES

This action would result in increased scientific knowledge about past cultures in the PRIA Area. This knowledge would come from cultural resource inventories, the Chacoan roads project, and any site excavations that were carried out prior to mining. The value of the information retrieved from these mitigation measures would be directly related to the quality of available professional expertise.

Typically, cultural resource inventories and data salvage must be performed under very tight time frames because of the large amounts of capital and labor involved in energy development. Analysis of site data may be delayed, but when analysis does occur specific research questions as presented in the lessee's mitigation proposal can be addressed and the data will be preserved for analysis by future researchers. Based on presently available information, it is unlikely that the integrity of any site on the PRIA Area can be maintained under the Proposed Action without continual on-site monitoring.

A total of 171 known sites and an estimated 542 sites (Table 3-10) could be destroyed through mining activities. Total disturbance for this and the No Action Alternative would be 171 recorded sites and between 1,012 and 1,492 predicted sites. Sites left intact on pillars within mined areas would retain little scientific value.

Vibration from blasting, heavy mine equipment, haul trucks and trains could affect the stability of standing masonry walls and rock cairns. Twenty of the 26 PRLAs are within 10 miles of Chaco Culture National Historical Park and its detached parcels. (This 10 mile limit is an arbitrary figure. Only through studies on blasting affects on masonry structures will the critical distance of the blast from the site be known that will not cause structural damage). Blasting may weaken the standing walls of the structures within the park. Sites could be partially or completely destroyed by surface swells, tension cracks, and crumbling of the edges of mesas from subsidence of areas overlying deep mines. Judging from field observations of OSM archeologists (Killam, personal communication 1980), the occurrence of subsidence and its effects on archeological resources cannot be predicted.

Changes in present patterns of natural erosion could also affect sites. Alteration of present drainage channels could accelerate water erosion of some sites. Wind-borne soils from disturbed areas would be deposited in new locations, possibly burying previously visible sites in downwind areas.

The number of construction workers and permanent employees at the mines would be another source of potential damage to cultural resources not only to sites within tract boundaries but to sites outside tract boundaries. According to traditional Navajo belief, artifacts from the past should be left undisturbed. However, non-Navajos employed in the mines may not share Navajo beliefs regarding the handling of artifacts. Others with little knowledge or interest in past culture could contribute to the destruction of sites without being aware of their existence. Direct site vandalism would be another probable occurrence. Arizona, Utah and parts of New Mexico have witnessed a tremendous

TABLE 3-10

CULTURAL RESOURCE SITES IMPACTED BY ALTERNATIVE

Alternative	Sites Recorded		Sites Predicted <u>b/</u>	
	1987	2000 Total	1987	2000 Total
No Action <u>a/</u>				470-950
Preference Right Lease Issuance <u>a/</u>		171		542
Bypass <u>a/</u>		28	19-20	26-78 165-188
Minimum Surface Owner Conflicts <u>a/</u>		213	19	58-78 600-708
Target <u>a/</u>		412	32-44	132-245 814-1,105
High <u>a/</u>		638	32-44	132-245 1,727-2,295

Notes: a/ Impacts are attributable solely to this particular alternative and/or action.
b/ These predictions assume that the sites are evenly distributed across each tract, which they are not. Therefore, the number of sites may be either higher or lower.

amount of pot hunting and looting of cultural sites due to the increase in population associated with coal development and related activities. Direct or indirect damage from use of off-road vehicles would also occur to sites on or off the leased tracts. If permanent housing was constructed near the PRLA Area, site damage would be accelerated both by the increase in resident population and by the number of leisure hours the residents spent in the area. Lease terms and regulations should be highly effective in identifying sites before mining occurs and somewhat effective in analyzing information gathered.

VISUAL RESOURCES

The type of impacts associated with this action would generally be the same as those identified under the No Action Alternative. Under the Preference Right Lease Issuance, four PRLAs (NM-3834, NM-3838, NM-6801 and NM-11916) overlap the designated VRM Class II land of the Bisti and De-na-zin WSAs (see Visual B). All of these PRLAs are expected to be mined by underground methods. Disturbance caused by surface facilities for these mines could occur to the topography, natural scenic features, and visual quality on these PRLAs, which are composed primarily of fragile badlands.

Surface facilities on parts of NM-3838 and NM-11916 that lie outside of the Class II lands could reduce or disrupt the topographic and scenic view from the Bisti and De-na-zin WSAs. Parts of NM-3838 and NM-11916 are considered suitable for surface mining; this activity could have similar impacts on the nearby De-na-zin and Bisti Class II scenic areas.

Surface mining of PRLAs NM-3918, NM-3919, NM-8745, and NM-9764 could cause visual disruptions to visitors at Chaco Culture National Historical Park, especially from Pueblo Alto site where the Park Service maintains an interpretive viewpoint to assist visitors in understanding the relationship between the resources preserved in the park and the designated Chaco Outliers (Archeological Protection Sites).

All other PRLAs and projects fall within VRM Class III and Class IV lands. The same impacts as discussed above would occur, but would be less disruptive to the lower visual class of these areas.

WILDERNESS

The type of impacts associated with this action are in addition to and would generally be the same as those identified under the No Action Alternative. There are seven lease applications which overlap WSAs. The overlaps range from 1 percent (42.76 acres) on PRLA NM-6801 to 95 percent (4,591.28 acres) on PRLA NM-3834. The sights and sounds associated with surface mining of these PRLAs could disrupt the wilderness characteristics of naturalness and opportunities for solitude in the WSAs. PRLAs cover most of the Ah-shi-sle-pah WSA and these will probably be surface mined if the area is dropped from wilderness consideration, thus destroying the naturalness of the area and scenic resources. There are also PRLAs over a good portion of the De-na-zin WSA but the coal here is at a depth which makes only underground mining practicable. If this area does not become designated as wilderness, some impacts might occur to the wilderness character in parts of the area. On PRLA NM-3834, NM-3838, NM-3918, NM-3919, NM-6801, NM-6804, and NM-11916, a total of 13,424 acres (and an undetermined amount of coal) would be removed from mining and surface occupancy

associated with underground mining. This would be done in compliance with the unsuitability criterion that concerns protection of the areas' suitability for wilderness designation. Lease terms and processing procedures are effective in preventing damage to wilderness values during congressional consideration. They will also be effective in preventing adverse effects to areas' designated as wilderness.

RECREATION

The type of impacts associated with this action are in addition to and would generally be the same as those identified under the No Action Alternative. Mining of the PRLAs could distract from the quality of the recreational experience in some areas of the EIS Region. Surface mining of the area presently known as the Ah-shi-sle-pah WSA, should it not be designated as wilderness, would destroy the scenic, backcountry, and primitive recreation values there. Surface mining of NM-11916, adjacent to the Bisti WSA would have detrimental effects on the primitive recreation experience in the management area due to the dust, noise, visual intrusions, and increased use.

Surface mining on PRLAs NM-3918, NM-3919, NM-8745, and NM-9764 could cause visual and noise distractions to visitors at major recreation areas in the EIS Region, including the Chaco Culture National Historical Park, and especially the popular Pueblo Alto site.

Mining of several PRLAs and existing leases could potentially distract from the visual qualities of the Continental Divide National Scenic Trail (CDNST) if it is eventually routed near or through them.

Should all applicants meet final showing and should coal development occur, 50,188 (Table 3-11) acres of accessible public land would be removed from public use for the life of the mines. This is expected to be a very small percentage of the total recreation acreage available. Public use on these tracts for participation in dispersed recreational hunting, collecting, sightseeing, off-road vehicle use, and back-country use can be characterized as relatively low-density use. However, those users would have to seek their recreation elsewhere.

Additional dispersed recreation demand from natural population growth, proposed coal leasing population growth, and displaced recreationists could diminish the quality of the recreation experience.

The increased traffic flow and rerouting of State Highway 57 could interrupt visitation to the Chaco Culture National Historical Park. The viewing of active mining along State Highway 57 would provide the opportunity to provide an interpretation program by the lessee or the BLM to those driving to and from the park.

Mining operations (as proposed in the initial showing of the various applications) indicate mining or surface disturbance from mining would occur within the boundaries of the proposed Bisti/De-na-zin Area of Critical Environmental Concern (ACEC) of the recreation program. Because this ACEC includes two of the Wilderness Study Areas (WSAs), no direct impact would be anticipated to occur on them.

TABLE 3-11
ACREAGE NOT AVAILABLE TO DISPERSED RECREATION USE
BY ALTERNATIVE a/

Alternative	1987	Year 2000
No Action <u>b/</u>		
Preference Right Lease Issuance	23,100	50,188
Bypass	1,642	3,059
Minimum Surface Owner Conflicts	3,242	7,340
Target	10,052	15,357
High	23,962	30,145

Note: a/ These figures were derived by multiplying expected annual disturbance (acres) by the life of the mine (years) and adding surface facilities (acres) for each mine that would be in production during 1987 or the year 2000.

b/ Data not available.

The Continental Divide Trail, another proposal of the BLM's recreation program, would not be directly impacted by coal mining activities on the PRLAs. Visitor use of the trail could, however, be indirectly impacted by access roads, rail spurs, utilities, noise, and dust as a result of leasing. Some of these activities would intermittently impede use of the trail, present safety hazards and diminish the quality of the recreation experience for those visitors hiking the trail through the PRLA Area.

LAND USES (Roads, Railroads, Pipelines, Transmission Lines)

The total acreage of rights-of-way for roads, powerlines, natural gas pipelines, and railroads located on the surface mineable portions of the PRLAs are listed in Table 3-12. Approximately 276 acres of these facilities rights-of-way would be disturbed by relocation to other areas (refer to Table 3-12). On the underground mineable portions of the PRLAs, a total of 103 acres of rights-of-way would be affected (Table 3-13). (For further information refer to Appendix E-1 and E-2.)

Natural gas pipelines could be jeopardized by subsidence fracturing the lines. Subsidence from underground tracts could result in damage to public roads crossing these tracts (Appendix E-4 and E-5). Such damage would necessitate maintenance and possible reconstruction to make the roads safe. Leakage in high pressure gas lines could create a safety hazard, and could disrupt service to customers. Subsidence could cause some change in wire tension and create undesirable sagging of power lines.

Other land uses such as livestock grazing and recreation are discussed in those sections of this chapter. Lease terms and regulations should be effective to protect these land uses or to mitigate adverse effects.

TRANSPORTATION

Table 3-5 shows predicted increases in car and light duty truck traffic due to the development of the PRLAs and other projects in the EIS Region. Increases were projected for the years 1987 (Start up) and 2000 (peak production).

The largest increase in average daily traffic would occur along two major routes connecting the tri-city area of Farmington, Aztec, Bloomfield. One route includes segments of New Mexico 44 and New Mexico 57, and the other route is NM 371.

The highways listed in Table 3-5 are the major arteries to access the PRLAs, but other public roads (e.g., county and Bureau of Indian Affairs) are located in the vicinity. The Jicarilla reservation roads could also receive an increase in traffic. The Preference Right Lease Issuance would add about 258 vehicles per day (vpd) to highways in the area by 1987 and about 4,190 vpd by the year 2000. This increase can be compared to the existing average vpd in Chapter 2 (refer to Table 2-11).

Increase noise, air pollution, traffic accidents, road congestion, maintenance and construction, and animal road kills could result from an

TOTAL LAND USE IMPACTS FROM DEVELOPMENT OF SURFACE MINEABLE FEDERAL COAL AT MINE STARTUP (1987) AND PEAK PRODUCTION (YEAR 2000) BY ALTERNATIVE (ACRES)

b/ Impacts are attributable solely to this particular alternative and/or action.

TABLE 3-13

TOTAL LAND USE IMPACTS FROM DEVELOPMENT OF UNDERGROUND MINEABLE FEDERAL COAL BY ALTERNATIVE
(ACRES)

Alternative	Public Roads	Powerlines	Natural Gas Pipelines	Proposed Railroads	Total
No Action <u>a/</u>					
Preference Right Lease Issuance <u>b/</u>	71	11	21	—	103
Bypass <u>b/</u>	—	—	—	—	—
Minimum Surface Owner Conflict <u>b/</u>	33	11	23	27	94
Target <u>b/</u>	33	11	23	27	94
High <u>b/</u>	70	78	35	62	245

Note: a/ Data not available.b/ Impacts are attributable solely to this particular alternative and/or action and are based on analysis by each tract.

increase in traffic. Because most of the rangelands are not fenced, additional traffic on these roads could result in an increase in the number of accidents involving livestock.

The increased number of accidents projected as a result of the additional traffic from mining under this action is listed in Table 3-6. Increases would occur on New Mexico 44 and New Mexico 371 in 1987 and the year 2000.

Coal that is hauled by trucks to loadout facilities, would increase the number of accidents and frequency of road maintenance costs. Maintenance costs could be greater than the revenue collected through regular fees.

SOCIAL AND ECONOMIC FACTORS

Employment

Development under the Preference Right Lease Issuance would generate employment increases in two of the population centers analyzed for the EIS Region (refer to Table 3-14). The employment increase estimates for 1987 range from 18 percent in the Farmington area to 336 percent in Cuba. Estimates for the year 2000 range from the Farmington area's 16 percent to Cuba's 324 percent.

The EIS Region now experiences some unemployment, as do the specific communities associated with this alternative. Based on this fact and the employment needs of the region, it is estimated that 50 percent of the hiring related to the potential mining of the PRLAs and existing leases would be local hires (within the region). The exception to this would be direct employment in underground mining, because special skills are required; a 30 percent local hire figure was used. The balance of the people getting jobs as a result of leasing the PRLAs under this alternative would be in-migrants. These workers and their families would settle in the communities of the region that are closest to the PRLAs in production and that offer desirable services.

Infrastructure (Housing, Community Expenditures, Water Use, Wastewater Systems)

Housing needs would increase in the major communities throughout the region (refer to Table 3-15). An increase of 145 percent is predicted for 1987 in Cuba, and for the year 2000, the projected increase is 128 percent.

Public expenditures were examined by county and by community where figures were available. The source of funding for these expenditures was not analyzed, but a per-capita expenditure was used to determine the required increase in expenditures to maintain current levels of service. These figures are shown in Table 3-16. An increased tax base would be available for most counties.

A required expenditure increase of 175 percent above the baseline was projected for Cuba for 1987. For the year 2000, the projected increase would be 116 percent. Although the mining operations that impact Cuba may not be located in Sandoval County, the Sandoval County tax base would be increased by the additional demand for residential and business properties by mining personnel living in Cuba.

TABLE 3-14

SOCIAL AND ECONOMIC FACTORS--
EMPLOYMENT INCREASES BY ALTERNATIVE

Alternative	Farmington		Cuba		Grants		Gallup		Milan		Crowpoint/Thoreau	
	1987b	2000c	1987b	2000c	1987b	2000c	1987b	2000c	1987b	2000c	1987b	2000c
Baseline	27,440	32,020	1,992e	2,154e	12,118	17,148	6,700	7,892	1,855	2,630	764	933
Preference Right Lease Issuance a/	4,973 18%	5,191 16%	1,144 33%	1,731 324%	d/							
Bypass a/	Same as Preference Right Lease Issuance											
Minimum Surface Owner Conflicts a/		3,070 10%			1,644 29%	2,680 33%			1,644 110%	2,680 102%		
Target a/		5,136 16%	465 149%	773 145%	974 17%	3,172 40%			974 53%	3,172 121%		
High a/		4,005 13%	468 23%	2,156 100%	1,338 11%	3,807 22%	804 12%	4,454 56%	1,338 72%	3,807 145%	1,806 236%	3,008 322%

Note: a/ Impacts are attributable solely to this particular alternative and/or action. (Percentages cannot be added.)
b/ Figures for each alternative represent only the increase due to coal leasing above the 1987 projected base.
c/ Figures for each alternative represent only the increase due to coal leasing above the 2000 projected base.
d/ No figures represent an increase of less than 10 percent.
e/ Cuba CCD Baseline.

TABLE 3-15

SOCIAL AND ECONOMIC FACTORS--
HOUSING NEED INCREASES BY ALTERNATIVE

Alternative	Farmington 1987 ^b 2000 ^c	Cuba 1987 ^b 2000 ^c	Grants 1987 ^b 2000 ^c	Gallup 1987 ^b 2000 ^c	Milan 1987 ^b 2000 ^c	Crowpoint/Thoreau 1987 ^b 2000 ^c
Baseline		314 ^e 537 ^e	13,516	8,631		668 816
Preference Right Lease Issuance ^{a/}	^{a/}	454 687 145% 128%	^{a/}		^{a/}	
Bypass ^{a/}	Same as PRLA Lease Issuance					
Minimum Surface Owner Conflicts ^{a/}						
Target ^{a/}		183 307 58% 57%				
High ^{a/}		189 946 60% 176%	1,528 11%	1,965 23%		716 107% 1,164 143%

Note: ^{a/} Impacts are attributable solely to this particular alternative and/or action. (Percentages cannot be added.)
^{b/} Figures for each alternative represent only the increase due to coal leasing above the 1987 projected base.
^{c/} Figures for each alternative represent only the increase due to coal leasing above the 2000 projected base.
^{d/} No figures represent an increase of less than 10 percent.
^{e/} Cuba Village.

TABLE 3-16

SOCIAL AND ECONOMIC FACTORS--
INCREASE IN COMMUNITY EXPENDITURES (\$000) BY ALTERNATIVE

Alternative	Farmington		Cuba		Grants		Gallup		Milan		McKinley County	
	1987 ^b	2000 ^c	1987 ^b	2000 ^c	1987 ^b	2000 ^c	1987 ^b	2000 ^c	1987 ^b	2000 ^c	1987 ^b	2000 ^c
Baseline	71,876	83,980	485 ^e	829 ^e				20,904				3,353
Preference Right Lease Issuance ^{a/}	6,932 10%	^{d/}	850 175%	962 116%		^{d/}				^{d/}		
Bypass ^{a/}	Same as PRLA Lease Issuance											
Minimum Surface Owner Conflicts ^{a/}												
Target ^{a/}	8,410 10%											
High ^{a/}	4,440 21%											
	397 12%											

Note: ^{a/} Impacts are attributable solely to this particular alternative and/or action. (Percentages can not be added.)
^{b/} Figures for each alternative represent only the increase due to coal leasing above the 1987 projected base.
^{c/} Figures for each alternative represent only the increase due to coal leasing above the 2000 projected base.
^{d/} No figures represent an increase of less than 10 percent.
^{e/} Cuba Village.
^{f/} Crowpoint-Thoreau data not available.

Most expenditures change from year to year, and revenues can be adjusted by changing property value assessments, taxable values, and mill levies for property taxes, and rates for other types of taxes. Table 3-17 shows severance and property tax revenue increases. It appears that even with some gap between the time population increases occur and the time coal revenues start coming in, the San Juan and McKinley County communities and school districts should be able to meet their financial needs and perhaps have some surpluses. The Sandoval County area (involving the Cuba school district) would likely have increases with little revenue directly from mining.

Table 3-18 shows that water use is expected to increase as population increases, with allocations of water staying at the same levels. The estimated water use increases range from 12 percent in Farmington to 222 percent for Cuba in 1987. Year 2000 increases are estimated between 11 percent in Farmington and 147 percent in Cuba. Perhaps more important than the water use is the water right; Cuba presently is not shown to have a water right allocation. On an annual basis, the City of Aztec, in the Farmington area, has a current use higher than the recorded right.

Table 3-19 shows that the need for sewage treatment capacity would grow with the population, with a 177 percent increased needs in Cuba in 1987. The smaller communities would need to build new capacity. The increased capacity estimated to be needed by the year 2000 is 118 percent for Cuba.

Population increases would affect the availability of all public services provided by local and, to some extent, state government. Taxable valuation, mill levies, and allowable bonded indebtedness are all factors in determining the availability of funds for government services. The percent increase in the level of expenditure required to maintain the current level of infrastructural services has been discussed above.

Local governments are more limited in their ability to assure provision of adequate supplies of housing and health care personnel, which are largely private sector functions. Failure to provide enough new housing of suitable quality and at an affordable price (due to high land and construction costs, restrictive zoning regulations or limitations on new sewer or water hookups) would force many new residents to live in substandard housing or in unplanned trailer settlements on unincorporated lands. From the community standpoint, this situation could result in a loss of potential tax revenues, create obstacles to effective community planning, and make it more difficult to integrate the newcomers into the local political process.

A further decline in the availability of health care facilities and/or personnel would result, at a minimum, in greater inconvenience to residents forced to travel long distance for health care. At worst, it could contribute to an increase in the incidence and severity of health problems among residents, if the latter respond to the inconvenience by foregoing needed health care.

Demography

Table 3-20 shows the population change for the specific alternative and the percent change above the baseline. For 1987, a projected percent increase of 131 was made for Cuba.

TABLE 3-17

ESTIMATED SEVERANCE AND PROPERTY TAX REVENUE INCREASES FROM
COAL MINING OPERATIONS, 1987 AND YEAR 2000 BY ALTERNATIVE

Alternative	1987		Year 2000	
	Severance Tax Revenue	Property Tax Revenue	Severance Tax Revenue	Property Tax Revenue
	($\$000$) % Increase over Baseline	($\$000$) % Increase over Baseline	($\$000$) % Increase over Baseline	($\$000$) % Increase over Baseline
No Action (Baseline)	28,683	a/ 2,621	19,292	1,762
Preference Right Lease Issuance			14,924	1,397
Bypass			2,861	263
Minimum Surface Owner Conflicts			9,718	1,384
Target	3,507	12	18,870	2,201
High	5,893	21	32,159	4,101

Note: a/ No figures represent an increase of less than 10 percent.

TABLE 3-18

SOCIAL AND ECONOMIC FACTORS--
WATER USE (ACRE FEET) INCREASE BY ALTERNATIVE

Alternative	Farmington 1987 ^b	2000 ^c	Cuba 1987 ^b	2000 ^c	Grants 1987 ^b	2000 ^c	Gallup 1987 ^b	2000 ^c	Milan 1987 ^b	2000 ^c	Crownpoint/Thoreau 1987 ^b	2000 ^c
Baseline	17,212	20,880	452 ^e	770 ^e			3,449		1,025		1,286	
Preference Right Lease Issuance ^{a/}	2,010 12%	2,285 11%	1,002 222%	1,135 147%	d/							
Bypass ^{a/}	Same as PRLA Lease Issuance											
Minimum Surface Owner Conflicts ^{a/}												
Target ^{a/}	2,449 12%	305 68%	507 66%									
High ^{a/}	307 68%	1,518 197%	828 24%	923 90%					1,537 120%			

Note: ^{a/} Impacts are attributable solely to this particular alternative and/or action. (Percentages cannot be added.)
^{b/} Figures for each alternative represent only the increase due to coal leasing above the 1987 projected base.
^{c/} Figures for each alternative represent only the increase due to coal leasing above the 2000 projected base.
^{d/} No figures represent an increase of less than 10 percent.
^{e/} Cuba CCD.

TABLE 3-19

SOCIAL AND ECONOMIC FACTORS--
INCREASE IN NEED FOR WASTEWATER TREATMENT (IN 000'S GALLONS PER DAY) BY ALTERNATIVE

Alternative	Farmington		Cuba		Grants		Gallup		Milan		Crownpoint/Thoreau	
	1987 ^b	2000 ^c	1987 ^b	2000 ^c	1987 ^b	2000 ^c	1987 ^b	2000 ^c	1987 ^b	2000 ^c	1987 ^b	2000 ^c
Baseline	13,335	15,580	115 ^e	196 ^e				1,327			151	185
Preference Right Lease Issuance ^{a/}	1,279 10%		204 177%	231 118%	d/							
Bypass ^{a/}	Same as PRLA Lease Issuance											
Minimum Surface Owner Conflicts ^{a/}												
Target ^{a/}	1,558 10%		62 54%	103 53%								
High ^{a/}			62 54%	309 158%			331 21%				121 80%	202 109%

Note: ^{a/} Impacts are attributable solely to this particular alternative and/or action. (Percentages cannot be added.)

^{b/} Figures for each alternative represent only the increase due to coal leasing above the 1987 projected base.

^{c/} Figures for each alternative represent only the increase due to coal leasing above the 2000 projected base.

^{d/} No figures represent an increase of less than 10 percent.

^{e/} Cuba Village.

TABLE 3-20
SOCIAL AND ECONOMIC FACTORS--
POPULATION INCREASES BY ALTERNATIVE

Alternative	Farmington 1987b/ 2000e/	Cuba 1987b/ 2000e/	Grants 1987b/ 2000e/	Gallup 1987b/ 2000e/	Milan 1987b/ 2000e/	Crownpoint/Thoreau 1987b/ 2000e/
Baseline		970e/ 1,658e/	14,314 20,331	21,908 25,808	4,692 6,654	2,500 3,050
Preference Right Lease Issuance a/	1,271 131%	1,923 116%	d/			
Bypass a/	Same as Preference Right Lease Issuance					
Minimum Surface Owner Conflicts a/			1,827 13%	2,977 15%	1,827 39%	2,977 45%
Target a/		859 52%	3,525 17%		1,082 23%	3,525 53%
High a/	520 54%	2,573 155%	1,486 10%	5,481 21%	1,486 32%	2,006 80%
						3,342 110%

Note: a/ Impacts are attributable solely to this particular alternative and/or action. (Percentages cannot be added.)
b/ Figures for each alternative represent only the increase due to coal leasing above the 1987 projected base.
c/ Figures for each alternative represent only the increase due to coal leasing above the 2000 projected base.
d/ No figures represent an increase of less than 10 percent.
e/ Cuba Village.

Table 2-13 shows the ethnic distribution of the 1980 population for the major communities in the EIS Region. Where population is estimated to grow (as it would in 1987 and the year 2000 in Cuba), change in the ethnic mix could bring social changes and changes in the political balance of power.

In the larger cities of the EIS Region such as Farmington, the rapid growth and change associated with the energy boom over the last several years have provided experience with social change. Therefore, further population changes would not have as high a level of impact on the social structure as they would in smaller, less experienced towns. Some increased crime rates and service needs correlated with population increases (particularly with construction and other temporary types of labor) would be felt throughout the impacted areas.

The American Indians (primarily Navajos) nearest the PRLAs and existing leases would experience social changes. Mining would affect their lifestyle, especially the opportunity to use sacred areas, gathering areas for material used in religious ceremonies, and land on which they produce at least a part of their livelihood. These concerns are discussed more specifically in the next section of this chapter.

AMERICAN INDIAN CONCERNS

The type of impacts associated with leasing this action would generally be the same as those identified under the No Action Alternative. The forced relocation of thirty-nine Navajo families from home sites that they have occupied for generations, could result in extensive increases in the measures of mental illness, as it has elsewhere, where Navajos have been relocated. Table 3-21 shows that 49 residences (surface mining), 6 residences (underground mining), 6 known gravesites (surface mining), 5 known gravesites (underground mining), and 4 known sacred sites (surface mining) could be disturbed under this action. Appendices F-1, F-4, and F-5 present analysis by PRLA tract. Total disturbance for this and the No Action Alternative is not known and cannot be adequately projected. This would also include lands that occupants would be relocated on. The impacts would be analyzed when the lands that the individuals would be located on are identified. Lease terms and regulations will be somewhat effective in mitigating these impacts except for those persons unwilling to move to accommodate mining.

TABLE 3-21

IMPACTS ON AMERICAN (NAVAJO) INDIANS BY ALTERNATIVE AND TYPE OF ITING

Alternative	Residences				Relocation/Disturbance				Known Sacred Sites	
	Under-		Known Gravesites		Under-		Known Gravesites		Under-	
	Surface	ground	Total	Surface	ground	Total	Surface	ground	Surface	ground
No Action <u>a/</u>										
Preference Right Lease Issuance <u>b/</u>	49	6	55	6	5	11	4	0	4	0
Bypass <u>b/</u>	4	0	4	3	0	3	1	0	1	0
Minimum Surface Owner Conflict <u>b/</u>	3	20	23	0	0		0	0	0	0
Target <u>b/</u>	50	20	70	23-33	0	23-33	3	0	3	0
High <u>b/</u>	345	110	455	25-35	0	25-35	3	1	3	4

Note: a/ Data not available.b/ Impacts are attributable solely to this particular alternative and/or action and are based on analysis for each tract.

PRLA ALTERNATIVE 1: EXCHANGE OR LEGISLATION

If the Bureau determines that a PRLA holder discovered coal in commercial quantities during the term of a prospecting permit, the holder has a right to a lease, and the Bureau has no general discretion to reject the PRLA on environmental or any other grounds. Once the Bureau makes the determination, mining can be prevented if:

- (1) The lessee is unable to submit a permit application which complies with the applicable requirements of the Surface Mining Control and Reclamation Act, or other applicable legal requirements; or
- (2) The Congress passes legislation which requires the relinquishment of the PRLA rights in exchange for other leases, bidding rights, or cash; or
- (3) The Secretary determines that coal development would not be in the public interest and the lessee voluntarily agrees to exchange his lease rights for coal bidding rights, or leases for sodium, sulphur, potassium, or phosphate; or the Secretary issues a certificate of bidding rights instead of a lease.
- (4) A market is not developed before the expiration of the diligent development period.

This section considers the environmental effects of two subalternatives which would result in the elimination of mining for all or some of the PRLAs. Each subalternative could be carried out by exchange, with the PRLA holders' agreement, or by legislation. The environmental effects of proceeding one way or the other are not significant.

Each of the exchange subalternatives would have a similar effect: the mining of coal within the area covered by the relinquished rights would not occur, and the site would remain as described in the no-action alternative. The coal would remain available for mining in the future under competitive coal leasing provisions but it could only be available if the previous conflicts are resolved. If the PRLA holder received lease rights or coal bidding rights, the impacts from mining could occur elsewhere. The exact nature of the rights that would be received and the environmental effects from the granting of those rights are so speculative and remote that further analysis cannot be made now. This information is not essential for a reasoned decision on whether exchanges

should be pursued since the availability of lands suitable for an exchange can be reasonably assumed to exist. These lands would not necessarily be in the San Juan Basin.

a. Total Exchange or Legislation

If issuance of the Preference Right Lease is found to be not in the public interest, all Preference Right Lease rights could with the consent of the applicant be exchanged or otherwise transferred. This would eliminate all of the environmental and social effects of coal mining on the subject tracts as well as all of the economic benefits including increased state revenues. The no-action alternative should be compared with the discussion of the effects of leasing the PRLAs to determine the effects of this proposal. Any coal production in the Region would have to come from existing coal production sources or from new competitive tracts.

This alternative could reduce the potential overall regional coal production levels, unless the applicant used the certificate on a tract that did not receive a bid, thereby lowering the potential for cumulative disturbance of all resources, availability of services and the potential for economic benefits through increased tax revenues and employment. The main benefit of this subalternative would be to direct coal development away from the areas of highest paleontological, cultural, and socioeconomic conflict to areas of less conflict. This subalternative could greatly diminish the overall viability of the area for increased employment, development, and standard of living.

b. Exchange or Legislation for Selected PRLAs

Under this subalternative, the Bureau would pursue exchanges or other extinguishment of PRLA rights for particular PRLAs which present significant or unusual environmental effects. Numerous possibilities exist; several specific possibilities are presented as examples of the available subalternatives. Other choices are possible, but additional analysis is not essential to the decision-maker at this time.

The following discussion summarizes the impacts of example 1 and 2 of the Partial PRLA Lease Issuance subalternative. The approximate TSP concentration would be 100 ug/m^3 for 24 hours. The New Mexico State TSP 24-hour ambient air quality standard is 150 ug/m^3 . Therefore, the standard would not be exceeded.

An estimated 1,076 fossil localities would be destroyed by surface mining. Population increases and increased access to the region would result in unauthorized collection and vandalism. During subsurface mining some information would become available.

Approximately 15,435 acres of vegetation, soils, topography, and wildlife habitat would be temporarily disturbed by surface mining with short-term acceleration of erosion and sedimentation. Approximately 515 acres could be removed from production by facilities construction, resulting in long term productivity loss. Soil mixing, contamination and compaction would occur.

There would be some subsidence on approximately 28,270 acres. About 1.02 billion tons of coal would be removed.

Approximately 12,275 acre feet of water per year used during the mining process. The existing surface drainage patterns would be disturbed. There would also be disruption of aquifers and destruction of shallow ground water sources.

An estimated 1,778 AUMs would be lost. Vegetation should return to or near full production in the long term.

Approximately 434 cultural resource sites are predicted. Site excavations and data recovery prior to mining would result in increased knowledge of the area. Unmitigated or unknown sites and Chaco roads in surface mined areas would be destroyed.

Mining would reduce the scenic values on a total of 15,435 acres. The exchange of leases from wilderness study areas would slightly improve the wilderness experience in De-na-zin WSA. In Ah-shi-sle-pah the wilderness qualities would be preserved. An unknown number of acres of rights-of-ways would be removed or relocated, these rights-of-ways include roads, powerlines, and transmission lines.

Traffic accidents would increase by more than 89 and average daily traffic by more than 4,190 in the year 2000. There would be a need for more road maintenance and construction.

Population would increase by 1,923 people (116%) in Cuba in the year 2000. Employment would increase by 5,191 jobs (16%) in Farmington and 1,731 jobs (324%) in Cuba in the year 2000. Lifestyles and cultural and religious values for Navajo, people living on or near the PRLA's would be disrupted. Expansion of community infrastructures would be necessary. Fourteen Navajo families occupying the PRLA area and adjacent land would be relocated.

On 11 known gravesites the lessee would have to get permission to move the gravesites or an area 100 feet surrounding the site could not be mined. The unknown gravesites could be destroyed if not identified.

Four known sacred sites would be destroyed or would need ceremonies performed to mitigate the impacts to them. Unknown sites could be destroyed by surface mining.

1. Exchange or Legislation for PRLAs with Navajo Occupancies

PRLAs NM 585 (7 residences), 3918 (11 residences), 6801 (6 residences), 8128 (14 residences), 8130 (12 residences), 8715 (2 residences) and 8717 (3 residences) for a total of 55 Navajo residences (see Visual D, Appendix F1, Draft EIS) which could be affected by PRLA development. The Navajo Chapter Houses (Nageezi, Pueblo Pintado, and Ojo Encino) in the area of these PRLAs have expressed opposition to coal leasing, as have many Navajos who have testified or commented to the Bureau. This subalternative evaluates the effects of not developing the PRLAs that are covered in whole or part by Navajo occupancies or residences. These PRLAs contain approximately 22,000 acres of land,

approximately 10,000 acres of which is either Indian land, or withdrawn for the use of Indians.

The effect of this subalternative would be to prevent the mining on portions of these tracts and all attendant environmental and socioeconomic effects. A summary of the major resources on each of these PRLAs can be found in Appendix A-6 of this document. In addition, it is possible that this subalternative would also prevent or make more difficult coal mining on adjacent lands.

The main benefit to this alternative would be to eliminate a major conflict between the Navajos living in the area and coal production. The conflict exists partly because current laws exempt PRLAs from the surface owner consent provisions of the Surface Mining Control and Reclamation Act. However, it does not preclude surface occupants from receiving compensation for surface damages or losses.

This means that landowners over PRLAs have no legal right to veto the issuance of these leases as they would over competitive leases if they were "qualified surface owners." Under the proposed action, owners of occupied dwellings on trust surface allotments or homesteads could prevent mining within 300 feet of the dwelling or could waive that right in writing. In addition, the landowners over coal in PRLAs must either consent to mining of lands they own or force the lessee to post a bond covering damages mining will cause to the land.

The combination of these protections may result in significant financial benefits to the persons living on the actual leases issued to the PRLA holders and gives a reasonable level of protection. To some, the financial payments and limited surface protection for dwellings may not be adequate to compensate for the disruption in their personal lives or the disruption in the lives of their relatives in the area. No payments are required to be made to adjacent off-lease residents. Exchanges or similar measures would prevent this disruption, as well as preserve the physical resource values on the lands.

The main drawback to this subalternative is the elimination of the availability for mining of coal reserves and the attendant economic benefits of the production. This includes the possibility of very considerable economic benefits to the allotment owners and others living over the coal. These benefits could range up to 2 or 3 percent of the value of the coal sold.

This alternative would not affect the availability of coal which could be offered through competitive leasing, or coal production on other existing coal sources. It may have an effect on the decision to build the leg of the Star Lake Railroad from Gallo Wash to Star Lake, since PRLAs NM 585, 8128, 8130, 8175 are all in that area. The adverse affects on coal development of this sub-alternative could be lessened by exchanging smaller parts of the PRLAs such as a 40-acre protection zone for residences; this might, however, cause such serious disruption to logical mining units that coal production would still be hindered greatly.

2. Exchange or Legislation for PRLAs with Special Paleontological Values and the Ah-shi-sle-pah WSA

Parts of three PRLAs, NM 3918, 3919, and 6804, are within the Ah-shi-sle-pah WSA. Parts of NM 3752 and 3753 are within the area known as the "Fossil Forest." Both contain areas of high values for paleontological resources (refer to Chapter 2 Paleontology Resources). The Bureau's current proposed action would allow mining in Ah-shi-sle-pah if Congress decides not to make the land a part of the National Wilderness Preservation System and would not allow mining in the Fossil Forest up to a 10-year period of scientific study (September, 1991).

Under this subalternative, the Bureau could pursue exchange or other extinguishment of the PRLA rights to preserve the wilderness and paleontological values of these lands.

The effect of this subalternative is to retain these lands in their current status to allow prolonged, periodic scientific study of the lands. The subalternative would also make unavailable for mining over 350 million tons of coal and would not require the intensive premining study of the paleontological resources of these areas, and the attendant gain in scientific knowledge from this study.

Designation of the Ah-shi-sle-pah WSA as a wilderness area would result in specific management actions and plans to preserve the qualities within the WSA boundaries. Management emphasis would be on preserving the visual, paleontological, recreational (sightseeing, hiking, etc.) and cultural resources. Mineral development, grazing, rights-of-ways, etc. may be allowed only within the limits allowed under wilderness management.

Non-designation of the Ah-shi-sle-pah WSA would result in a resumption of multiple-use management. Mineral development could become the primary short-term use of the area for PRLAs issued within WSA boundaries. Recreational, paleontological, cultural and grazing uses would resume upon completion of PRLA mining or if leases are not issued for PRLAs. Specific details for management of the area (wilderness and nonwilderness) are listed and analyzed in the Proposed Wilderness Areas Environmental Impact Statement (BLM, 1982).

Protection of the Fossil Forest Area may also affect the efficient recoverability of coal in areas adjacent to the Fossil Forest as those lands appear to be in the middle of a logical mining unit consisting of PRLAs NM 3752, 3753, and 3754. The paleontological community has been given an extensive opportunity to discuss whether the Fossil Forest should be protected. There appears to be a majority with the opinion that study followed by mining is adequate, while other paleontologists contend that the values are sufficiently unique that only in situ protection would be adequate. The proposed action reflects the view of those who believe that study is adequate; the subalternative reflects the view of those who believe in situ protection is required.

COMPETITIVE COAL LEASE ISSUANCE

No Action for the competitive leasing proposals assumes lease issuance and development of all 26 PRLAs. Refer to the Preference Right Lease Issuance for analysis of the impacts.

IMPACTS-BYPASS ALTERNATIVE

This alternative proposes to offer for lease eight competitive tracts all of which would be surface mined. These eight tracts are located next to existing and proposed mines and PRLAs (refer to Table 1-3), and it is assumed that the tracts would not be mined but would be bypassed unless adjacent mining operations extend into them.

Federal in-place reserves that would be leased total approximately 129 million tons, of which 113 million tons would be recoverable. Projected average annual coal production would be approximately 2.26 million tons from 1985 through the year 2007 for seven of the eight tracts.

AIR QUALITY

The impacts would generally be of the same type as those identified under the No Action Alternative, and Preference Right Lease Issuance but a larger area would be affected. The total emissions under this alternative would be 6,196 tons of TSP per year. Table 3-1 shows that for this alternative, under worst-case meteorological conditions, the New Mexico State 24-hour standard of 150 ug/m³ would be exceeded by 13 ug/m³, with a TSP level at the mines of 163 ug/m³. This level is an increase of 63 ug/m³ over the No Action Alternative and Preference Right Lease Issuance and could exceed the Class II 24-hour PSD limit in the vicinity of the mines. The areal extent of the impacts would generally be limited to short distances from the tract boundaries and federal ambient standard would not be exceeded.

The visual range would be reduced to 65 miles from 73 miles.

The impact of this alternative on air quality is considered significant on a 24-hour basis in the local area of the mines. This impact would not occur all the time. The frequency that the mines exceed the 24-hour standard has not been determined. Frequency is influenced by mine emissions, i.e. acres disturbed, tons of coal mined, and haul road traffic (volume and speed) and atmospheric conditions, i.e. number of days receiving moisture, atmospheric stability, mixing heights, and inversions.

TOPOGRAPHY AND MINERAL RESOURCES

The type of impacts associated with this alternative would generally be the same as those identified under the No Action Alternative. Table 3-2 shows that under this alternative, approximately 364 and 1,342 acres would be

disturbed in 1987 and the year 2000, respectively. A total of 6,130 acres would be disturbed by mining, of which 600 acres would be for surface facilities. Total acreage disturbed under this, the No Action Alternative, and Preference Right Lease Issuance would be 53,150 acres, this represents less than 1 percent of the EIS region. Impacts to construction materials (sand and gravel) would be of the same type as discussed in the No Action Alternative.

PALEONTOLOGY

The type of impacts associated with this alternative would generally be the same as those identified under the No Action Alternative and Preference Right Lease Issuance. Table 3-3 shows that under this alternative, an estimated total of 271 fossil localities would be disturbed. The total number of fossil localities disturbed for this, the No Action Alternative and Preference Right Lease Issuance would be 2,508.

SOILS

Table 3-22 shows that mining facilities (structures, haul roads, storage areas, buildings, and parking areas) would cause the permanent loss of approximately 39 acres of the soil resource. A total of approximately 6,130 acres would be disturbed by eight surface mines. Annual surface disturbance from mining activities under this alternative would consist of approximately 417 acres per year. Surface disturbance at the onset of mining activities (1987) would include approximately 494 acres, and approximately 831 acres of surface disturbance would occur during peak production by the year 2000. Total acreage disturbed for this, the No Action Alternative and Preference Right Lease Issuance would be 53,150 acres (refer to Table 3-2). This represents less than 1 percent of the EIS region.

Removal of vegetation cover would expose barren soil to wind and water action during stripping operations and stockpiling. Soil would be lost as levels of sedimentation and suspended dust particles increase.

Contamination of topsoil and subsoils may occur during surface mining operations. Accidental spills of toxic materials such as oils, chemicals, and waste materials may cause soil contamination. Contamination may also occur because of toxic and nutrient-deficient materials found within spoil piles, overburden and bedrock material.

Soil stability would be disrupted and changed. Stripping operations, handling, and stockpiling would cause a loss of soil fertility by the introduction of inferior subsoils and the biological death of soil micro-organism. This would reduce soil productivity. Surface mining activities would alter soil structure, causing changes in the soil-water regime. This action would affect water infiltration and permeability rates and the ability of the soil to hold water. Changes in the soil-water regime would limit plant growth.

Surface mining operations would cause compaction, resulting in lower permeability and infiltration rates. Handling, transporting, and stockpiling of soils would also cause compaction and mixing of various-textured soils and horizons. These activities may change bulk density and create different soils. Disturbances to soils would create significant impacts to paleontological and cultural resources, as discussed in those sections under this alternative.

TABLE 3-22

SOILS IMPACTS BY ALTERNATIVE

Alternative	Acres/Soil Disturbed		Acres Surface Reclaimed/Revegetated		Number Tracts Involved with Reclamation		Total Acres Permanently Lost	
	1987	2000	1987	2000	1987	2000	1987	2000
No Action ^{a/}								
Preference Right Lease Issuance ^{a/}								
Bypass	494	831	47.5	127	2	2	39.42	39.42
Minimum Surface Owner Conflicts	638	2,180	40	435	3	4	39.0	39.0
Target	1,762	4,417	48	914	2	12	78.42	78.42
High	3,697	8,559	40	1,522	1	14	78.42	78.42

Note: ^{a/} These figures are not available for the year 1987 and 2000.

Projected reclamation potential discussed in the No Action Alternative is expected to be similar under this alternative.

WATER RESOURCES

Surface water

The general impacts on surface water caused by the Bypass alternative actions are the same as those described for the No Action Alternative. The nature of the impacts do not change; the magnitude of the impact is proportional to the amount of surface area disturbed. During mining and reclamation, the larger the area disturbed, the less the area contributing surface runoff and the larger the decrease in streamflow and sediment. After mining the larger the area successfully reclaimed, the greater the reduction in sediment yield and streamflow. Increases in the number of mining operations may increase the possibility of accidental contamination of surface water and of failure of impoundments and diversion structures.

Ground Water

The impacts associated with leasing this alternative will generally be the same type as those identified under Preference Right Lease Issuance. The Entrada Sandstone (Layer 1) and Westwater Canyon Member of the Morrison Formation (Layer 3) would be the only aquifers impacted by additional pumping and coal development under this alternative. A maximum additional drawdown (over and above that caused by Preference Right Lease Issuance) of 30 feet in the Entrada would occur between the years 2026 and 2030. A maximum additional drawdown of 10 feet in the Westwater Canyon Member would occur between the years 1996 and 2015. Plate 2 (enclosed with the Draft EIS) shows the maximum differences between projected drawdowns of the No Action Alternative, Preference Right Lease Issuance, and the Bypass Alternative, and the time period during which those maximums would occur. The maximum additional drawdowns and the years in which they would occur are summarized in Table 3-23. Total water needs for this, the No Action Alternative and Preference Right Lease Issuance would be approximately 16,830 acre-feet of water per year.

VEGETATION/LIVESTOCK GRAZING

Table 3-4 shows that the Bypass Alternative would remove approximately 6,130 acres of native vegetation and 603 AUMs of livestock forage on BLM and BIA administered allotments over the life of the mines or until reclamation takes place. This represents .2 percent of the AUMs in the Chaco Planning Unit (refer to Map 3-1). In addition, four reservoirs, 2 miles of fence and a well would be destroyed by surface mining. By the start of production in 1987, there would be 494 acres of native vegetation removed and 43 AUMs of forage temporarily lost. At the peak of mining in the year 2000, there would be 897 acres of vegetation removed and 82 AUMs of forage. Five allotments out of the 105 allotments administered by the BLM and BIA in the Chaco Planning Unit (5%) and 21 allottees out of 2,243 allottees (1%) would lose a portion of or all of the AUMs available because of mining the tracts under this alternative. The total disturbance for this, the No Action Alternative and Preference Right Lease Issuance would be to 53,150 acres, 5,801 AUMs, 14 reservoirs, 23 miles of fence, 5 wells, 3 cattleguards, and 2 corrals, this represents 1.8 percent of the AUMs in the Chaco Planning Unit.

TABLE 3-23

MAXIMUM ADDITIONAL DRAWDOWNS IN MAJOR AQUIFERS OF THE SAN JUAN STRUCTURAL BASIN UNDER THE COMPETITIVE LEASING ALTERNATIVES
(see Plate 2, enclosed in the Draft EIS)

Alternative ^{a/}	Aquifer	Maximum Drawdown (Feet)	Year of Occurrence	General Area(s) of Occurrence
Bypass	Entrada Sandstone	30	2026-2030	Southern and Central Basin
	Westwater Canyon Member	10	1996-2015	Central Basin
Minimum Surface Owner Conflicts	Entrada Sandstone	30	2031-2035	Southern and Central Basin
	Westwater Canyon Member	100	2021-2025	Central Basin
	Gallup Sandstone	300	1996-2005	Lee Ranch Area of Basin
	Entrada Sandstone	70	2026-2035	Southern and Central Basin
Target	Westwater Canyon Member	100	2021-2025	Central Basin (more extensive cone of depression for drawdowns in range of 1 to 70 feet).
	Gallup Sandstone	300	1996-2005	Lee Ranch area of basin (more extensive cone of depression for drawdowns in range of 10 to 70 feet).
	Entrada Sandstone	70	2026-2035	Southern and Central Basin (slight further outward spread of 10 and 30 foot drawdown contours).
High	Westwater Canyon Member	100	2021-2025	Central Basin
	Gallup Sandstone	300	1996-2005	Lee Ranch area of basin (slight further outward spread of cone of depression).

Note: ^{a/} The figures on this table are over and above those in Preference Right Lease Issuance.

WILDLIFE

Mule Deer and Elk

During mining under this alternative, 60 to 100 mule deer and six to twelve elk of a larger herd would be subjected to disturbance associated with all phases of mining activity. No deaths are expected to occur to these animals as a result of mining. It is possible that some poaching would occur as a result of the mines being in the area of deer winter range. However, hunter success during the regular deer season would not be significantly affected because of poaching or because of the loss of deer winter range. All 200 acres of this tract would be unsuitable for big game until reclamation is completed, then positive effects would be expected with big game concentrating on seeded areas. Reclaimed areas would possibly attract more animals than the natural habitat could support. This 200 acres represent about one percent of the winter range occupied by this herd.

Species of High Federal Interest

Increased human activity associated with mining under this alternative would have the same type of impacts on migrating, wintering and nesting prairie falcons, ferruginous hawks, and golden eagles that would occur under the No Action Alternative and Preference Right Lease Issuance. Similar impacts would be expected in 1987 from mining on 160 acres of the Bisti #4 Tract. An additional 200 acres mined on the Bisti #4 Tract by the year 2000 would result in similar or possibly increased disturbance depending on the proximity of mining to nest sites. Table 3-9 shows that the total number of nests of species of high federal interest that could be disturbed by this the No Action Alternative and Preference Right Lease Issuance would be 1 prairie falcon, and 6 ferruginous hawks.

CULTURAL RESOURCES

Table 3-10 shows that for this alternative, 28 sites have been recorded on the portions of the tracts containing federal coal or surface, and between 165 and 188 are predicted to occur. They would be destroyed by surface mining unless avoided and left intact. Utilizing the predicted site density for each tract, the number of sites that may be destroyed at mine start-up (1987) and peak production (2000) has been estimated. Between 19 and 20 sites may be destroyed in 1987, and between 26 and 78 in the area of surface disturbance in the year 2000. Total disturbance for this the No Action Alternative and Preference Right Lease Issuance would be to 199 recorded sites and between 1,148 and 1,680 predicted sites.

A probable segment of the Chacoan road system crosses the Hospah #1 tract and may cross Bisti #4 tract. The Chacoan Road study mitigated most of the road segments through testing and study. If new roads are found they would also be studied, if not they would be destroyed.

Additional sites outside of the coal lease tracts including Chacoan outliers designated as Archeological Protection Sites in P.O. 96-550, may be disturbed or destroyed by mine associated activities, unauthorized collection or vandalism with the increased population in the EIS region, thus limiting the scientific data available from the sites.

Five tracts are within 10 miles of Chaco Culture National Historical Park. Vibrations from blasting or other mining related activities may affect the stability of standing walls within the park.

The Advisory Council on Historic Preservation has listed actions that may cause adverse affects to cultural resources. They include: (1) destruction or alteration of all or part of a property, (2) isolation from or alteration of its surrounding environment, or (3) introduction of visual, audible or atmospheric elements that are out of character with the property or its setting (36 CFR 800.9). The damage or destruction of cultural sites from mining activities would result in the following losses: (1) scientific and cultural information for future research, (2) resources that may be valuable in terms of uniqueness in their natural setting, (3) buried, unsalvaged sites, and (4) sites important for social or religious reasons to native Americans. The loss of some of these values would be partially offset by information gained through implementation of the mitigation plan. Such information would add to the growing data base for cultural resources in northwest New Mexico.

The National Register of Historic Places eligibility of the 28 recorded sites has been determined through consultation between the BLM and New Mexico State Historic Preservation offices. Twenty-five of the sites have been recommended as eligible while three were recommended as ineligible. Before the mine plan is prepared an intensive cultural resources inventory of the portions of the lease tract, or portions of the mine plan area and adjacent areas that may be affected by lease related activities will be conducted. The National Register eligibility of all located sites will be determined. All sites on Federal lands found eligible will be addressed in a mitigation plan. Mitigation treatment for sites within the affected area may vary from data extraction to preservation in place. All cultural resources will be afforded the protection they are guaranteed through state and federal laws/regulations, and all mine lease stipulations.

VISUAL RESOURCES

The type of impacts associated with this alternative would generally be the same as those identified under the No Action Alternative and Preference Right Lease Issuance. Under the Bypass Alternative, all tracts are in either VRM Class III or IV, except for the La Plata Tract, which is not classified. Surface mining and facilities on these tracts would alter the visual landscape to a degree unacceptable in their present classes.

Surface mining of two tracts, Bisti #4 and Bisti #6, would cause significant visual impacts. Bisti #4 is adjacent to an area known as the "Fossil Forest" which has good sightseeing values. Adjacent surface mining would diminish this quality. A portion of Bisti #6 is also in a scenic badlands area, and part of the tract is near the Bisti Wilderness Study Area. Mining would destroy the scenic quality of the tract as well as cause a visual distraction to the scenic resources nearby for the life of the mine.

Visual B (enclosed in the draft EIS) displays the VRM classes on those lands affected by mining operations as a result of additional federal coal leasing. No VRM Class II lands would be directly impacted as a result of additional leasing under the Bypass Alternative.

WILDERNESS

Under this alternative, surface mining of Bisti #6 would have the same type of impacts as described for existing leases under the No Action Alternative and Preference Right Lease Issuance. Impacts would be more noticeable on the parts of the tract closest to the Bisti Wilderness Study Area (WSA). Some disturbance can be expected in 1987, but mining of this tract should be completed before the year 2000.

RECREATION

Under this alternative, mining-related population growth would increase dispersed recreation demand in the EIS Region. Mining operations would decrease the amount of public land available, resulting in additional pressures on the remaining lands. Impacts would include increased litter, vandalism, and ORV use, as discussed for the No Action Alternative and Preference Right Lease Issuance.

Surface mining of the Bisti #6 Tract would destroy the scenic quality of that tract and detract from the recreational experience in the nearby Bisti management area.

Mining of certain tracts would detract from the solitude, serenity and other specific recreation resources due to noise and visual effects that would reduce the quality of the recreational experience, while some recreation resources could be destroyed. Acres not available for recreation are shown in Table 3-11.

Surface mining of the Bisti #4 Tract would diminish the recreation experience in the adjacent Fossil Forest Area. The Star Lake West #2, Gallo Wash #1, and Hospah #1 tracts are within the corridor being studied for possible placement of the Continental Divide National Scenic Trail (CDNST). Surface mining of these tracts could disrupt actual trail location and aesthetics.

LAND USES (Roads, Railroads, Pipelines, Transmission Lines)

The type of impacts associated with this alternative would generally be the same as those identified under the No Action Alternative and Preference Right Lease Issuance. Table 3-12 shows that under the Bypass Alternative, 13 acres of rights-of-way for natural gas pipelines would be disturbed by relocation or removal. Total disturbance under this the No Action Alternative and Preference Right Lease Issuance would be 105 acre of rights-of-way for public roads, 81 acres for powerlines, 64 acres for natural gas pipelines, and 39 acres for proposed railroads.

TRANSPORTATION

The type of impacts associated with mining under this alternative would generally by the same as those identified under the No Action Alternative and Preference Right Lease Issuance. Table 3-5 shows predicted increases in car and light duty truck traffic. A traffic increase would occur on New Mexico 371

by 1987. By the year 2000, traffic increases would occur on New Mexico 44, New Mexico 197, and New Mexico 371.

Two competitive lease tracts under this alternative would require transportation other than the Star Lake Railroad. Due to the location of the La Plata #1 Tract north of Farmington, coal would have to be trucked to power plants (probably west of Farmington) as is currently being done with coal mined from the La Plata mine. If the La Plata transportation corridor is constructed, coal will be transported via the corridor instead of Highway NM-170 and NM-550 west of Farmington.

The projected increase in number of accidents due to this alternative is shown on Table 3-6. By 1987, an increase would occur on New Mexico 371. By the year 2000, accident increases would also occur on New Mexico 44.

SOCIAL AND ECONOMIC FACTORS

Construction, production, and transportation workers on adjacent mines would be utilized for the mining operations on the tracts in the Bypass Alternative. Therefore, the type and extent of impacts associated with leasing this alternative would be the same as those identified under the Preference Right Lease Issuance.

AMERICAN INDIAN CONCERNS

The type of impacts associated with leasing this alternative would generally be the same as those identified under the No Action Alternative and Preference Right Lease Issuance. Table 3-21 shows that 4 residences (surface mining), 9 known gravesites (surface mining), 5 known gravesites (underground mining), and 5 known sacred sites (surface mining) could be disturbed under this alternative. Total disturbance for this, the No Action Alternative and Preference Right Lease Issuance would be 53 residences (surface mining), 6 residences (underground mining), 9 known gravesites (surface mining), 5 gravesites (underground mining), and 5 known sacred sites (surface mining).

IMPACTS-MINIMUM SURFACE OWNER CONFLICTS ALTERNATIVE

The Minimum Surface Owner Conflicts Alternative was selected on April 27, 1983, by the Regional Coal Team as the preferred alternative subject to further evaluation by the State of New Mexico or the identification of minimal environmental, social and economic impacts. It is not necessarily that of the Secretary's, nor does it bind the Secretary in any way in reaching a final federal leasing decision. This alternative proposes to lease 11 tracts. Six of the tracts would be surface mined, and five would be underground mined. Federal in-place reserves that would be leased are approximately 916 million tons, of which 349 million tons are recoverable. Projected average annual coal production would be approximately 7.15 million tons from 1985 through the year 2007 for 9 of the 11 tracts. It appears that minimal conflicts regarding mining would occur with the surface owners of these tracts with some consent having been filled.

AIR QUALITY

The type of impacts associated with this alternative would generally be the same as those identified under the No Action Alternative and Preference Right Lease Issuance. Table 3-1 shows that for this alternative, under worst-case meteorological conditions, the New Mexico State 24-hour standard of 150 ug/m^3 would be exceeded by 84 ug/m^3 with a TSP level at the mines of 234 ug/m^3 . The 234 ug/m^3 was obtained by modeling the mines from this, the No Action Alternative and PRLAs.

The total emissions from mining under this alternative would be 16,183 tons of TSP per year. The visual range near the mine boundaries would be reduced to 60 miles from 73 miles. The areal extent of the impact is generally limited to short distances from the lease area boundaries.

TOPOGRAPHY AND MINERAL RESOURCES

Surface Mining

The type of impacts associated with this alternative will generally be the same as those identified under the No Action Alternative and Preference Right Lease Issuance. Table 3-2 shows that for this alternative, approximately 308 and 4,988 acres would be disturbed in 1987 and the year 2000, respectively. A total of 19,302 acres would be disturbed by mining, of which 1,050 acres would be for surface facilities. The total acreage disturbed for this, the No Action Alternative and Preference Right Lease Issuance would be 66,327 acres, this represents less than 1 percent of the EIS Region.

Underground Mining

Subsidence impacts would remain the same as discussed under the No Action Alternative and Preference Right Lease Issuance.

Surface facility construction would cause permanent changes of natural topography on about 400 acres.

Underground hazards and impacts to mineral development would remain the same as discussed in the No Action Alternative and Preference Right Lease Issuance. Oil and gas potential exists in the area; drilling for these commodities could conflict with coal development.

PALEONTOLOGY

The type of impacts associated with mining under this alternative would generally be the same as those identified under the No Action Alternative and Preference Right Lease Issuance. Table 3-3 shows that for this alternative, an estimated total of 136 fossil localities would be disturbed. The estimated total of fossil localities disturbed for this, the No Action Alternative and Preference Right Lease Issuance would be 2,373.

SOILS

The type of impacts associated with mining under this alternative would generally be the same as those identified under the No Action Alternative and Preference Right Lease Issuance. Table 3-22 shows that mining facilities (haul roads, structures, storage areas, buildings, and parking areas) would cause the permanent loss of approximately 39 acres of the soil resource. Approximately 19,302 acres of disturbance would be associated with six surface mines (510 acres per mine per year), and about 400 acres of surface disturbance with five underground mines. Surface disturbance at the onset of mining activities (1987) would consist of about 638 acres. Approximately 2,180 acres of surface disturbance would occur during peak mine production (year 2000). The total acreage disturbed by this and the No Action Alternative would be 66,322 acres (refer to Table 3-2).

A maximum of 80 acres per underground mine would sustain surface disturbance in the form of access roads, parking areas, storage yards, buildings, utilities, and mine structures. Surface structures and facilities associated with underground mines would result in vegetation removal and soil disturbance and thus susceptibility to wind and water action. Sediment rates would increase slightly because of vegetation removal and unstable soils, and the placement of mine structures and facilities would cause some soil compaction. Soil characteristics and properties (bulk density, permeability, productivity, potential, structure, infiltration rates, and micro-organisms) would be affected to some extent because of soil handling, transporting, and stockpiling. Soil contamination may occur because of accidental spills (man-made products) and toxic material from disturbed soils, bedrock, and spoil piles.

Projected reclamation potential discussed in the No Action Alternative is expected to be similar under this alternative.

WATER RESOURCES

Surface Water

The general impacts on surface water caused by this alternative are the same as those described for the No Action Alternative. The nature of the impacts do not change; the magnitude of the impact is proportional to the amount of surface area disturbed. During mining and reclamation, the larger the area disturbed the less the area contributing surface runoff and the larger the decrease in streamflow and sediment. After mining, the larger the area successfully reclaimed the greater the reduction in sediment yield and streamflow. Increases in the number of mining operations may increase the possibility of accidental contamination of surface water and of failure of impoundments and diversion structures.

Ground Water

The type of impacts associated with mining under this alternative would generally be the same as those identified under the No Action Alternative and Preference Right Lease Issuance (Plate 1 enclosed in the Draft EIS). Additional coal development and pumping under this alternative would impact the

Entrada Sandstone (Layer 1), Westwater Canyon Member of the Morrison Formation (Layer 3), and Gallup Sandstone (Layer 5). Maximum drawdown (over and above that caused by Preference Right Lease Issuance) in the Entrada would be 30 feet, occurring between the years 2031 and 2035. Additional maximum drawdown in the Westwater Canyon Member would be 100 feet, occurring between the years 2021 and 2025. Additional maximum drawdown in the Gallup Sandstone would be 300 feet, occurring between the years 1996 and 2005 in the vicinity of the Lee Ranch Tracts. The maximum additional drawdowns and the year in which they would occur are summarized in Table 3-23, and shown on Plate 2 (enclosed in the Draft EIS). Total water needs for this, the No Action Alternative and Preference Right Lease Issuance would be approximately 18,950 acre-feet of water per year.

VEGETATION/LIVESTOCK GRAZING

The type of impacts associated with mining under this alternative would generally be the same as those identified under the No Action Alternative and Preference Right Lease Issuance. Table 3-4 shows that the Minimum Surface Owner Conflicts Alternative would remove approximately 19,302 acres of native vegetation and 4,268 AUMs of livestock forage on BLM and BIA administered allotments over the life of the mines or until reclamation is completed. This represents 1.3 percent of the AUMs in the Chaco Planning Unit (Map 3-1). In addition, nine reservoirs, 13 miles of fence, six wells and a spring would be destroyed by surface mining.

By the start of production in 1987, 638 acres of native vegetation would be removed and 114 AUMs of forage temporarily lost. At the peak of mining in the year 2000, 2,180 acres of vegetation would be removed with 455 AUMs of forage. Five allotments out of the 105 allotments administered by the BLM and BIA in the Chaco Planning Unit (5%) and 27 allottees out of 2,243 allottees (1.2%) would lose a portion of or all of the AUMs available because of mining the tracts under this alternative. The total disturbance for this, the No Action Alternative and PRLAs would be to 66,322 acres, 9,466 AUMs, 19 reservoirs, 34 miles of fence, 10 wells, 3 cattleguards, 2 corrals, and 1 spring. This represents 3 percent of the AUMs in the Chaco Planning Unit.

WILDLIFE

The type of impacts associated with mining under this alternative would generally be the same as those identified under the No Action Alternative and Preference Right Lease Issuance. Table 3-9 shows that the total number of nests of species of high federal interest impacted by this, the No Action Alternative and PRLAs would be 1 prairie falcon, 5 ferruginous hawks and 1 golden eagle.

CULTURAL RESOURCES

The type of impacts associated with mining under this alternative would generally be the same as those identified under the Preference Right Lease Issuance and the Bypass Alternative. Table 3-10 shows that for this alternative, 213 sites have been recorded on the portions of the tracts containing federal coal or surface, and between 600 and 708 sites are predicted. These would be destroyed by surface mining unless avoided and left intact.

Utilizing the predicted site density for each tract, the number of sites that may be destroyed at mine start-up (1987) and peak production (2000) has been estimated at 19 and between 58 and 78, respectively. Sites on tracts to be underground mined may be destroyed or disturbed by subsidence, and additional sites inside and outside of the tracts may be directly or indirectly destroyed. Total disturbance for this, the No Action Alternative and PRLAs would occur to 384 recorded sites and between 1,612 and 2,200 predicted sites.

The disturbances to cultural resources would be similar to those in the Bypass Alternative for surface mines. Underground mining may lead to surface subsidence which may destroy or disturb cultural resources. Surface facilities may also destroy sites. Placement of facilities away from sites may help avoid direct destruction, but there may be indirect disturbance to these sites.

Five tracts are within 10 miles of Chaco Culture National Historical Park. Vibrations from blasting or other mine related activities may affect the stability of standing walls within the park.

Subsidence from underground mining and the placement of above ground facilities may destroy a portion of the Pierre's Ruin archaeological community that is not protected by P.L. 96-550. Mining may also introduce foreign audible and visual elements into the surrounding area, which may reduce the interpretive value of the site.

A 2.5 mile segment of the Chacoan Great North Road crosses the Nageezi Tract and passes through the Pierre's Ruin Community. Segments of the road, and associated features outside of the portion of the community not to be leased, may be destroyed.

The National Register eligibility of the 213 recorded sites in these tracts has been determined. A total of 184 sites were found eligible and 29 were found ineligible. Before the mine plan is prepared a cultural resources inventory of the portions of the lease tract, or portions of the mine plan area and adjacent areas that may be affected by lease related activities will be conducted. The National Register eligibility of all located sites will be determined. All sites on federal lands found eligible will be addressed in a mitigation plan. Mitigation treatment for sites within the affected area may vary from data extraction to preservation in place. All cultural resource will be afforded the protection they are guaranteed through state and federal laws/regulations, and all mine lease stipulations.

VISUAL RESOURCES

The type of impacts associated with mining under this alternative would generally be the same as those identified under the No Action Alternative and Preference Right Lease Issuance. Under this alternative, all of the tracts are either in VRM Class III or IV, except for the La Plata #1 and #2 tracts which are not classified. Surface mining and surface facilities on these tracts would alter the visual landscape to a degree unacceptable in their present class.

WILDERNESS

The type of impacts associated with mining under this alternative would generally be the same as those identified under the No Action Alternative and Preference Right Lease Issuance. Under this alternative, surface facilities and operations for an underground mine on the Kimbeto #1 Tract could detract from the wilderness character of the nearby Ah-shi-sle-pah Wilderness Study Area because of noise, lighting, and sight of the facilities. Production on this tract is not expected until the year 2000.

RECREATION

The type of impacts associated with mining under this alternative would generally be the same as those identified under the No Action Alternative and Preference Right Lease Issuance. Acres not available for recreation use during mining are shown in Table 3-11.

Under this alternative, the Lee Ranch East, West, and Middle, and Divide tracts are within the corridor being studied for possible placement of the Continental Divide National Scenic Trail. Surface mining of these tracts could disrupt actual trail location and cause a safety hazard for hikers.

LAND USES (Roads, Railroads, Pipelines, Transmission Lines)

Surface Mining

The type of impacts associated with mining under this alternative would generally be the same as those identified under the No Action Alternative and Preference Right Lease Issuance. Table 3-12 shows that under this alternative, 96 acres for powerlines and 5 acres for proposed railroads would be disturbed by relocation or removal. Total disturbance for this, the No Action Alternative and PRLAs would be 105 acres for public roads, 177 acres for powerlines, 51 acres for natural gas pipelines, and 44 acres for proposed railroads.

Underground Mining

Table 3-13 shows that under this alternative, 33 acres of rights-of-way for public roads, 11 acres for powerlines, 23 acres for natural gas pipelines, and 27 acres for proposed railroads would be disturbed by subsidence, relocation or removal. Total disturbance for this, the No Action Alternative and PRLAs would be 104 acres for public roads, 22 acres for powerlines, 44 acres for natural gas pipelines, and 27 acres for proposed railroads.

TRANSPORTATION

The type of impacts associated with mining under this alternative would generally be the same as those identified under the No Action Alternative and Preference Right Lease Issuance. Table 3-5 shows predicted increases in car

and light duty truck traffic. Traffic increases on New Mexico 53/334 and New Mexico 509 would occur by 1987. By the year 2000, traffic increases would occur on New Mexico 44, New Mexico 57, New Mexico 53/334 and New Mexico 509. A major impact would occur on New Mexico 44, which is a heavily travelled artery from Bloomfield, New Mexico to Albuquerque. Upgrading of this segment has just begun.

The projected increase in numbers of accidents due to this alternative is shown on Table 3-6. By the year 2000, accident increases would occur on New Mexico 53/334 and New Mexico 44.

SOCIAL AND ECONOMIC FACTORS

The type of impacts associated with mining under this alternative would generally be the same as those identified under the Preference Right Lease Issuance. Tables 3-14 through 3-20 show the increases to Grants, Milan, and Farmington for employment, population, housing, community expenditures, water use and wastewater treatment.

AMERICAN INDIAN CONCERNS

The type of impacts associated with mining under this alternative would generally be the same as those identified under the No Action Alternative and Preference Right Lease Issuance. Table 3-21 shows that 3 residences (surface mining), 20 residences (underground mining), 6 known gravesites (surface mining), 5 known gravesites (underground mining), and 4 known sacred sites (surface mining) could be disturbed under this alternative. Total disturbance for this, the No Action Alternative and Preference Right Lease Issuance would occur to 52 residences (surface mining) 26 residences (underground mining), 12 known gravesites (surface mining), 10 gravesites (underground mining), and 8 known sacred sites (surface mining).

IMPACTS-TARGET ALTERNATIVE

This alternative proposes to lease 24 tracts. Nineteen tracts would be surface mined and five would be underground mined. Federal in-place reserves to be leased are approximately 1.32 billion tons, with approximately .7 billion tons being recoverable. Projected average annual coal production would be approximately .013 billion tons from 1985 through the year 2007 from 21 of the 24 tracts.

AIR QUALITY

The type of impacts associated with mining under this alternative would generally be the same as those identified under the No Action Alternative and Preference Right Lease Issuance but over a larger area. The total emissions under the Target Alternative would be 18,803 tons of TSP per year. Table 3-1 shows that, under worst-case meteorological conditions, the New Mexico State 24-hour standard of 150 ug/m³ would be exceeded by 84 ug/m³ with a TSP level

at the mines of 234 ug/m³. The 234 ug/m³ was obtained by modeling the mines from this, the No Action Alternative and Preference Right Lease Issuance.

The PSD Class II 24-hour limit could be exceeded near the mine boundaries, but the TSP level would drop within a short distance from the mine. Visual range near the mines would be reduced from 73 to 60 miles. Similar visual reductions will occur at Chaco Culture National Historical Park. The maximum average annual mean was calculated to be 42 ug/m³, which does not exceed the state or federal annual standards.

TOPOGRAPHY AND MINERAL RESOURCES

Surface Mining

The type of impacts associated with mining under this alternative would generally be the same as those identified under the No Action Alternative and Preference Right Lease Issuance. Table 3-2 shows that for the Target Alternative, approximately 859 and 10,593 acres would be disturbed in 1987 and the year 2000, respectively. A total of 35,977 acres would be disturbed by mining, of which 2,100 acres would be for surface facilities. The total acreage disturbed by this, the No Action Alternative and PRLAs would be 82,997 acres, this represents less than 1 percent of the EIS region.

Underground Mining

Subsidence impacts would remain the same as those discussed under the No Action Alternative and Preference Right Lease Issuance.

Surface facility construction would cause permanent changes of natural topography on about 400 acres.

Underground hazards and impacts to mineral development would remain the same as those discussed under the No Action Alternative and Preference Right Lease Issuance. Oil and gas potential exists in the region; drilling for these commodities could conflict with coal development.

PALEONTOLOGY

The type of impacts associated with mining under this alternative would generally be the same as those identified under the No Action Alternative and Preference Right Lease Issuance. Table 3-3 shows that under the Target Alternative, an estimated 1,400 fossil localities would be disturbed. The estimated total number of fossil localities disturbed by this, the No Action Alternative and PRLAs would be 3,637.

SOILS

The type of impacts associated with mining under this alternative would generally be the same as those identified under the No Action Alternative and Preference Right Lease Issuance. Table 3-22 shows that mining facilities (haul roads, structures, storage areas, buildings, and parking areas) would

cause the permanent loss of approximately 78 acres of the soil resource. Approximately 35,977 acres would be disturbed by 24 surface mines, with annual disturbance being approximately 1,719 acres. Surface facilities would disturb approximately 400 acres associated with five underground mines. Surface disturbance at the onset of mining activities (1987) would consist of approximately 1,762 acres. Approximately 4,417 acres of surface disturbance would occur during peak mine production (year 2000). The total acreage disturbed by this, the No Action Alternative, and PRLAs would be 82,997 acres (refer to Table 3-2).

Projected reclamation potential discussed in the No Action Alternative is expected to be similar under this alternative.

WATER RESOURCES

Surface Water

The general impacts on surface water caused by this alternative are the same as those described for the No Action Alternative. The nature of the impacts do not change; the magnitude of the impact is proportional to the amount of surface area disturbed. During mining and reclamation, the larger the area disturbed the less the area contributing surface runoff and the larger the decrease in streamflow and sediment. After mining, the larger the area successfully reclaimed the greater the reduction in sediment yield and streamflow. Increases in the number of mining operations may increase the possibility of accidental contamination of surface water and of failure of impoundments and diversion structures.

Ground Water

The type of impacts associated with mining under this alternative would generally be the same as those identified under the No Action Alternative and Preference Right Lease Issuance. Additional coal development and groundwater pumping under the Target Alternative would create further drawdowns (over and above those caused by Preference Right Lease Issuance) in the Entrada Sandstone (Layer 1), Westwater Canyon Member of the Morrison Formation (Layer 3), and Gallup Sandstone (Layer 5). Maximum additional drawdown in the Entrada would be 70 feet, occurring between the years 2026 and 2035. Maximum additional drawdown in the Westwater Canyon Member would be 100 feet, occurring between the years 2021 and 2025, the same as that for the Minimum Surface Owner Conflicts Alternative. Maximum additional drawdown in the Gallup Sandstone would be 300 feet, occurring between the years 1996 and 2005, the same as that for the Minimum Surface Owner Conflicts Alternative. Plate 2 (enclosed in the Draft EIS), indicates a more extensive cone of depression for drawdowns in the range of 10 to 70 feet. The maximum additional drawdowns and the years in which they would occur are summarized in Table 3-23. Total water needs for this, the No Action Alternative and Preference Right Lease Issuance would be approximately 20,150 acre-feet of water per year.

VEGETATION/LIVESTOCK GRAZING

The type of impacts associated with mining under this alternative would generally be the same as those identified under the No Action Alternative and Preference Right Lease Issuance. Table 3-4 shows that the Target Alternative would remove approximately 35,952 acres of native vegetation and 6,045 AUMs of livestock forage on BLM and BIA administered allotments over the life of the mines. This represents 1.8 percent of the AUMs in the Chaco Planning Unit (Map 3-1). In addition, 15 reservoirs, 31 miles of fence, 9 wells and a spring would be destroyed by surface mining. A State sensitive plant species, Astragalus wingatus, could be removed by surface mining and facilities.

By the start of production in 1987, 1,819 acres of native vegetation would be removed and 257 AUMs of forage temporarily lost. At the peak of mining in the year 2000, 4,563 acres of vegetation would be removed with 730 AUMs of forage. Eighteen allotments out of the 105 allotments administered by the BLM and BIA in the Chaco Planning Unit (17%) and 104 allottees out of 2,243 allottees (5%) would lose a portion of or all of the AUMs available because of mining the tracts under this alternative. Total disturbance for this, the No Action Alternative and Preference Right Lease Issuance would be to 82,997 acres, 11,243 AUMs, (this represents 3.4 percent of the AUMs in the Chaco Planning Unit), 25 reservoirs, 52 miles of fence, 13 wells, 3 cattleguards, 2 corrals, and a spring and Astragalus wingatus would be affected.

WILDLIFE

The type of impacts associated with mining under the Target Alternative would generally be the same as those identified under the No Action and Bypass Alternatives and Preference Right Lease Issuance. Table 3-9 shows that the total number of nests of species of high federal interest impacted by this, the No Action Alternative and PRLAs would be a prairie falcon, 7 ferruginous hawk, and two golden eagle nests.

CULTURAL RESOURCES

The type of impacts associated with mining under this alternative would generally be the same as those identified under the Preference Right Lease Issuance and Bypass Alternative. Table 3-10 shows that for this alternative, 412 sites have been recorded on the portions of the tracts containing federal coal or surface and between 814 and 1,105 sites are predicted. The sites would be destroyed by surface mining unless avoided and left intact.

Using the predicted site density for each tract, the number of sites that may be destroyed at mine start-up (1987) and peak production (2000) has been estimated. Between 32 and 44 sites may be destroyed in 1987, and between 132 and 245 in the area of surface disturbance in the year 2000.

Sites on tracts to be underground mined may be destroyed or disturbed by subsidence. Additional sites inside and outside of the tracts may be directly or indirectly destroyed. Total disturbance for this, the No Action Alternative and Preference Right Lease Issuance would be to 583 recorded sites and between 1,826 and 2,597 predicted sites.

Nine tracts in this alternative are within 10 miles of Chaco Culture National Historical Park. Vibrations from blasting or other mining related activities may affect the stability of standing walls within the park.

Two and a half miles of the Chacoan Great North Road passes through the Nageezi tract. A portion of the road maybe destroyed by subsidence and placement of surface facilities. An extension of the Penasco Blanco to Ah-shi-sle-pah road may cross Bisti #1 and #4 tracts.

At the request of the New Mexico State Historic Preservation Officer one area of 80 acres within the Target Alternative is recommended as unsuitable for coal mining under Criterion 7. This parcel, located in the Bisti #1 tract was the scene of a nineteenth century battle between Navajo and Ute Indians. New information derived from ethnographic research could modify this recommendation.

The National Register of Historic Places eligibility of the 412 sites recorded in the tracts has been determined. Of the 412 sites that have had their eligibility determined 332 were found eligible for inclusion while 80 were found ineligible. Before the mine plan is prepared a cultural resources inventory of the portions of the lease tract, or portions of the mine plan area and adjacent areas that may be affected by lease related activities will be conducted. The National Register eligibility of all located sites will be determined. All sites on Federal lands found eligible will be addressed in place. All cultural resources will be afforded the protection they are guaranteed through state and federal laws/regulations, and all mine lease stipulations.

VISUAL RESOURCES

The type of impacts associated with mining under this alternative would generally be the same as those identified under the No Action Alternative and Preference Right Lease Issuance. All of the tracts under this alternative are either in VRM Class III or IV, except for La Plata #1 and #2, which are not classified. Surface mining and surface facilities on these tracts would alter the visual landscape to a degree unacceptable in their present class. Surface mining of the Bisti #2 Tract would destroy approximately 320 acres of scenic badlands and would disrupt the topography and scenic view from the Bisti WSA/ACEC. The badlands on this tract are in a scenic quality A-rated area and provide good sightseeing values.

WILDERNESS

Under this alternative, surface mining of the Bisti #2 Tract would cause the same type of impacts to the Bisti WSA as those identified in the No Action Alternative for existing leases. Production on this tract would be expected to begin in 1987 and annual production would have nearly doubled by the year 2000.

RECREATION

Under this alternative, the type of impacts to dispersed recreation would be the same as those discussed under the No Action Alternative and Preference Right Lease Issuance. Acres not available for recreation use are shown in Table 3-11.

Surface mining of the Bisti #2 Tract would destroy the scenic and recreational values of a portion of the Bisti Badlands and would have very detrimental visual and noise effects upon the quality of recreational experience in the Bisti management area directly adjacent. Objectionable sounds would include sirens and noises from blasting, operation equipment, and transportation. Adverse visual effects would result from the sight of the mining operation from within the WSA, lighting of the sky during night operations, and decreased visibility due to dust produced by mining.

In addition to the tracts identified under the Bypass and Minimum Surface Owner Conflicts Alternatives as possibly impacting the Continental Divide National Scenic Trail, the Johnson Trading Post and Star Lake East #1 tracts also fall within the corridor.

LAND USES (Roads, Railroads, Pipelines, Transmission Lines)

Surface Mining

The type of impacts associated with mining under this alternative would generally be the same as those identified under the No Action Alternative and Preference Right Lease Issuance. Table 3-12 shows that under the Target Alternative, 30 acres of rights-of-way for public roads, 177 acres for powerlines, 57 acres for natural gas pipelines, and 5 acres for proposed railroads would be disturbed by relocation or removal. Total rights-of-way disturbance for this, the No Action Alternative and PRLAs would be to 135 acres for public roads, 258 acres for powerlines, 108 acres for natural gas pipelines, and 44 acres for proposed railroads.

Underground Mining

The underground impacts associated with mining under this alternative would be the same type and number as those identified for the Minimum Surface Owner Conflicts Alternative.

TRANSPORTATION

The type of impacts associated with mining under this alternative would generally be the same as those identified under the No Action Alternative and Preference Right Lease Issuance. Table 3-5 shows predicted increases in car and light duty truck traffic. Traffic increases on New Mexico 44, New Mexico 57, and New Mexico 371 would occur by 1987. By the year 2000, traffic increases would occur on New Mexico 53/334, New Mexico 197 and New Mexico 170.

The projected increase in number of accidents due to this alternative is shown on Table 3-6. By the year 2000, accident increases would occur on New Mexico 44, New Mexico 197, and New Mexico 371. In 1987, the most significant increase would occur on New Mexico 371, which is presently being redesigned and paved. Once construction is completed, the accident rate for this highway may decrease.

SOCIAL AND ECONOMIC FACTORS

The type of impacts associated with mining under this alternative would generally be the same as those identified under the Preference Right Lease Issuance. Tables 3-14 through 3-20 show the increases in Grants, Milan, Farmington, and Cuba for employment, housing, population, community expenditures, water use and wastewater treatment.

AMERICAN INDIAN CONCERNS

The type of impacts associated with mining under this alternative would generally be the same as those identified under the No Action Alternative and Preference Right Lease Issuance. Table 3-21 shows that 50 residences (surface mining), 20 residences (underground mining), 23-33 known gravesites (surface mining), and 3 known sacred sites (surface mining) could be disturbed under this alternative. Total disturbance for this, the No Action Alternative and Preference Right Lease Issuance would be to 99 residences (surface mining), 26 residences (underground mining), 29-39 known gravesites (surface mining), 5 gravesites (underground mining), and 7 known sacred sites (surface mining).

IMPACTS - HIGH ALTERNATIVE

This alternative proposes to lease all 39 tracts brought forward in the tract selection process. Of the total, 28 tracts would be surface mined and 11 would be underground mined. Federal in-place reserves that would be leased total approximately 1.94 billion tons, of which approximately 1.09 billion tons are recoverable. Projected average annual coal production would be approximately .024 billion tons from 1985 through the year 2007 for 36 of the 39 tracts.

AIR QUALITY

The type of impacts associated with mining under this alternative would generally be the same as those identified under the No Action Alternative and Preference Right Lease Issuance, but over a greater areal extent. The total emissions under the High Alternative would be 30,514 tons of TSP per year. Table 3-1 shows that for this alternative, under worst-case meteorological conditions, the New Mexico State 24-hour standard of 150 $\mu\text{g}/\text{m}^3$ would be exceeded by 86 $\mu\text{g}/\text{m}^3$ with a TSP level at the mines of 236 $\mu\text{g}/\text{m}^3$. With an annual average of 42 $\mu\text{g}/\text{m}^3$, which does not exceed the state or federal annual standards. The 236 $\mu\text{g}/\text{m}^3$ is obtained by modeling the mines from this, the No Action Alternative and PRLAs.

The PSD Class II 24-hour increment could be exceeded near the mine boundaries, but would drop within a short distance from the mine. The visual range near the mine would be reduced from 73 to 60 miles.

TOPOGRAPHY AND MINERAL RESOURCES

Surface Mining

The type of impacts associated with mining under this alternative would generally be the same as those identified under the No Action Alternative and Preference Right Lease Issuance. Table 3-2 shows that for this alternative, approximately 1,771 and 23,641 acres would be disturbed in 1987 and the year 2000, respectively. A total of 68,641 acres would be disturbed by mining, of which 3,500 acres would be for surface facilities. The total acreage disturbed by this, the No Action Alternative and PRLAs would be 115,661 acres, this represents less than 1 percent of the EIS region.

Underground Mining

Subsidence impacts would remain the same as discussed in the No Action Alternative and Preference Right Lease Issuance.

Surface facility construction would cause permanent changes of natural topography on about 880 acres.

Underground hazards and impacts to mineral development would remain the same as those discussed in the No Action Alternative and Preference Right Lease Issuance. Oil and gas potential exists in the region, and drilling for these commodities could conflict with coal development.

PALEONTOLOGY

The type of impacts associated with mining under this alternative would generally be the same as those identified under the No Action Alternative. Table 3-3 shows that under this alternative, an estimated 1,693 fossil localities would be disturbed. The estimated total number of fossil localities disturbed by this, the No Action Alternative and PRLAs would be 3,930.

SOILS

The type of impacts associated with mining under this alternative would generally be the same as those identified under the No Action Alternative and Preference Right Lease Issuance. Table 3-22 shows that mining facilities (haul roads, structures, storage areas, buildings, and parking areas) would cause a permanent loss of approximately 78 acres of the soil resource. A total of approximately 68,641 acres would be affected by 28 surface mines, with annual surface disturbance consisting of approximately 2,230 acres per year. Surface facilities associated with 11 underground mines would disturb approximately 880 acres. Surface disturbance at the onset of mining activities (1987) would consist of approximately 3,697 acres, and approximately 8,559 acres of disturbance would occur during peak mine production (year 2000). Total acreage

disturbed by this, the No Action Alternative and PRLAs would be 115,661 acres (refer to Table 3-2).

Projected reclamation potential under the No Action Alternative is expected to be similar under this alternative.

WATER RESOURCES

Surface Water

The general impacts on surface water caused by this alternative are the same as those described for the No Action Alternative. The nature of the impacts do not change; the magnitude of the impact is proportional to the amount of surface area disturbed. During mining and reclamation, the larger the area disturbed, the less the area contributing surface runoff and the larger the decrease in streamflow and sediment. After mining, the larger the area successfully reclaimed, the greater the reduction in sediment yield and streamflow. Increases in the number of mining operations may increase the possibility of accidental contamination of surface water and of failure of impoundments and diversion structures.

Ground Water

The type of impacts associated with mining under this alternative would generally be the same as those identified under the No Action Alternative and Preference Right Lease Issuance. Additional coal development and ground-water pumping under the High Alternative would create further drawdowns (over and above those caused by Preference Right Lease Issuance) in the Entrada Sandstone (Layer 1), Westwater Canyon Member of the Morrison Formation (Layer 3), and Gallup Sandstone (Layer 5). The drawdown difference for the Entrada, Westwater Canyon Member, and Gallup Sandstone are indistinguishable from the drawdown difference under the Target Alternative, except for slight outward movement of the drawdown contours (refer to Plate 2 enclosed in the Draft EIS). The maximum additional drawdowns and the years in which they would occur are summarized in Table 3-23. Total water needs for this, the No Action Alternative and Preference Right Lease Issuance would be approximately 21,100 acre-feet per Year.

VEGETATION/LIVESTOCK GRAZING

The type of impacts associated with mining under this alternative would generally be the same as those identified under the No Action Alternative and Preference Right Lease Issuance. Table 3-4 shows that the High Alternative would remove approximately 68,641 acres of native vegetation and 9,977 AUMs of livestock forage on BLM and BIA administered allotments over the life of the mines. This represents 3 percent of the AUMs in the CHaco Planning Unit (Map 3-1). In addition, 28 reservoirs, 73 miles of fence, 17 wells, a spring and a corral would be destroyed by surface mining. A State sensitive plant species, Astragalus wingatus, could be removed by surface mining and facilities.

By the start of production in 1987, 3,771 acres of native vegetation would be removed and 490 AUMs of forage temporarily lost. At the peak of mining

in 2000, 8,863 acres of vegetation would be removed eliminating 1,230 AUMs of forage. Thirty allotments out of the 105 allotments administered by BLM and BIA in the Chaco Planning Unit (29%) and 246 allottees out of 2,243 allottees (11%) would lose a portion of or all of the AUMs available because of mining the tracts under this alternative.

Total disturbance for this, the No Action Alternative and Preference Right Lease Issuance would be to 115,661 acres, 15,175 AUMs, (this represents 4.6 percent of the AUMs in the Chaco Planning Unit), 38 reservoirs, 94 miles of fence, 21 wells, 3 cattleguards, 3 corrals, a spring, and Astragalus wingatus would be affected.

WILDLIFE

The type of impacts associated with mining under the High Alternative would generally be the same as those identified under the No Action and Bypass Alternatives and Preference Right Lease Issuance. Wintering mule deer and elk on the La Plata #3 Tract would be subject to stress associated with mining on 100 acres of their range. In 1987, 66 acres of big game winter range would be mined, with disturbance occurring throughout the tract from associated activities. By the year 2000, mining would be complete.

Table 3-9 shows that the total number of nests of species of high federal interest impacted by this, the No Action Alternative and PRLAs would be a prairie falcon's, 7 ferruginous hawk, and two golden eagle nests.

CULTURAL RESOURCES

The type of impacts associated with mining under this alternative would generally be the same as those identified under the Preference Right Lease Issuance and Bypass Alternative. Table 3-10 shows that for this alternative, 638 sites have been recorded on the portions of the tracts containing federal coal or surface, and between 1,727 and 2,295 sites are predicted. They would be destroyed by surface mining unless avoided and left intact.

Using the predicted site density for each tract, the number of sites that may be destroyed at mine start-up (1987) and peak production (2000) has been estimated. Between 32 and 44 sites may be destroyed in 1987, and between 132 and 245 in the area of surface disturbance in the year 2000. Sites on tracts to be underground mined may be destroyed or disturbed by subsidence. Additional sites inside and outside of the tracts may be directly or indirectly destroyed. Total disturbance for this, the No Action Alternative and PRLAs would be 809 recorded sites and between 2,739 and 3,787 predicted sites.

Eleven tracts in this alternative are within 10 miles of Chaco Culture National Historical Park. Vibrations from blasting or other mining related activities may affect the stability of standing walls within the park. An unstabilized standing Chacoan masonry structure in the Crownpoint Northeast tract could also be damaged.

The Chacoan South Road crosses approximately 0.3 miles of the Crownpoint Northeast tract. It and any associated features or structures would

be destroyed by mining. The total disturbance to Chacoan roads would include segments of the Chacoan Great North Road and the Chacoan South Road (approximately 3 miles) and an unknown amount of the Ah-shi-sle-pah road.

The mining of the Chico Wash South Tract under the High Alternative would cause direct and indirect disturbance to the Azabache Stage Station. Blasting may weaken or cause destruction of the standing walls.

Two additional areas in the High Alternative are recommended as unsuitable for coal mining, both in the Crownpoint Northeast tract. One hundred and sixty acres are set aside to protect a Chacoan shrine with standing masonry walls. Another 280 are set aside to protect a Basketmaker III-Pueblo I pithouse village and portions of the Chacoan South Road.

The National Register of Historic Places eligibility of the 638 recorded sites has been determined. Four-hundred and thirty-seven sites were found eligible while 201 were found ineligible. Before the mine plan is prepared a cultural resources inventory of the portions of the lease tract, or portions of the mine plan area and adjacent areas that may be affected by lease related activities will be conducted. The National Register eligibility of all located sites will be determined. All sites on federal lands found eligible will be addressed in place. All cultural resources will be afforded the protection they are guaranteed through state and federal laws/regulations, and all mine lease stipulations.

VISUAL RESOURCES

The type of impacts associated with mining under this alternative would generally be the same as those identified under the No Action Alternative and Preference Right Lease Issuance. In this alternative, all of the tracts are either VRM Class III or IV, except for the La Plata Tracts #1, #2, #3, and #4, which are not classified. Surface mining and facilities on these tracts would alter the visual landscape to a degree unacceptable in their present class. Surface mining of the Chico Wash South Tract would greatly affect the scenic views from atop the mesas of the Ignacio Chavez area.

WILDERNESS

Surface mining of the Chico Wash South Tract would have the same type of impacts to the wilderness character of the Ignacio Chavez WSA as those discussed in the No Action Alternative for existing leases near the Bisti WSA. Impacts from production would be present in 1987.

RECREATION

Under this alternative, the type of impacts to dispersed recreation would be the same as those discussed under the No Action Alternative and Preference Right Lease Issuance. Acres not available for recreation are shown in Table 3-11.

Surface mining of the Chico Wash South Tract would have impacts to two specific recreation resources. The Azabache Stage Station is within this tract; its structures could be weakened by blasting. Access to the site would also be cut off. This entire tract is within a scenic viewshed experienced from atop the mesas of the Ignacio Chavez WSA directly to the south. Mining would severely alter this view.

Tracts within the Continental Divide National Scenic Trail corridor that have not been mentioned previously include the Star Lake East (LC), Crownpoint Northeast and Crownpoint (HC). Mining on these tracts would impact the corridor in the same same way as mining on other tracts discussed under the Bypass, Minimum Surface Owner Conflicts, and Target Alternatives.

LAND USES (Roads, Railroads, Pipelines, Transmission Lines)

Surface Mining

The type of impacts associated with mining under this alternative would generally be the same as those identified under the No Action Alternative and Preference Right Lease Issuance. Table 3-12 shows that under the High Alternative, 141 acres of rights-of-way for public roads, 354 acres for powerlines, 66 acres for natural gas pipelines, and 5 acres for proposed railroads would be disturbed by relocation or removal. Total right-of-way disturbance for this, the No Action Alternative and PRLAs would be 246 acres for public roads, 435 acres for powerlines, 117 acres for natural gas pipelines, and 44 acres for proposed railroads.

Underground Mining

Table 3-13 shows that for this alternative 70 acres of rights-of-way for public roads, 78 acres for powerlines, 35 acres for natural gas pipelines, and 62 acres for proposed railroads would be disturbed by subsidence, relocation or removal. Total right-of-way disturbance for this, the No Action Alternative and PRLAs would be to 141 acres for public roads, 89 acres for powerlines, 56 acres for natural gas pipelines, and 62 acres for proposed railroads.

TRANSPORTATION

The type of impacts associated with mining under this alternative would generally be the same as those identified under the No Action Alternative and Preference Right Lease Issuance. Table 3-5 shows predicted increases in car and light duty truck traffic. By the year 2000, traffic increases would occur on New Mexico 53/344, New Mexico 57 (from Crownpoint to Junction 371), and New Mexico 509.

The Ta-ha-bah Well, Hogback, Twin Buttes, Pinehaven, and Breadsprings tracts are located approximately 2 to 12 miles south of the Atchison-Topeka and Santa Fe mainline near Gallup. Coal developed on these tracts would be transported to market destinations via this railroad. Detailed impacts of the construction of and traffic on haul roads from these tracts to loadout facilities on the mainline will be analyzed at the mine plan stage of the leasing process. Frequency of road maintenance and maintenance costs would increase. The costs are expected to be even greater than the normal fees collected from highway use by these vehicles.

The projected increase in the number of accidents due to this alternative is shown on Table 3-6. An increase would occur on New Mexico 44, New Mexico 197, and New Mexico 371 by 1987. By the year 2000, accident increases would also occur on New Mexico 32, New Mexico 44, New Mexico 197 and New Mexico 371. New Mexico 371 is presently being redesigned and paved, and the accident rate for this highway may decrease once construction is completed.

SOCIAL AND ECONOMIC FACTORS

The type of impacts associated with mining under this alternative would generally be the same as those identified under Preference Right Lease Issuance. Tables 3-14 through 3-20 show the increases to Grants, Milan, Farmington, Cuba, Gallup, and Crownpoint-Thoreau for employment, housing, population, community expenditures, water use, and wastewater treatment.

AMERICAN INDIAN CONCERNS

The type of impacts associated with mining under this alternative would generally be the same as those identified under the No Action Alternative and Preference Right Lease Issuance. Table 3-21 shows that 345 residences (surface mining), 110 residences (underground mining), 25-35 known gravesites, and 3 known sacred sites (surface mining), and 1 known sacred site (underground mining) could be disturbed under this alternative. Total disturbance for this, the No Action Alternative and Preference Right Lease Issuance would be to 394 residences (surface mining), 116 residences (underground mining), 31-41 known gravesites (surface mining) and 5 known gravesites (underground mining), 7 known sacred sites (surface mining), and 1 known sacred site (underground mining).

ADDITIONAL MITIGATING MEASURES

The analysis of the environmental effects of the proposed action and major program alternatives in chapter 3 describes the environmental effects remaining after application of and compliance with all regulations, statutes, standard lease terms and agency committed measures such as special stipulations to carry out the results of the application of unsuitability criteria. The mitigating measures in this section, marked with an asterisk, have also been included in the impact analysis for both the PRLAs and the competitive tracts and will be incorporated into any coal leases issued. The remaining measures are still under consideration but they are not expected to have any significant effect on regional impacts. These measures could be required by BLM, BIA, OSM or the State of New Mexico. A decision whether to adopt any of these other measures will be made as part of the process to decide whether and how much coal will be leased. These measures were contributed by Federal, State, local agencies and the general public. Where the environmental effect of the proposed measure is not self-explanatory, a brief explanation is included.

AIR QUALITY

Mitigation Measure: The lessee shall provide mitigation measures on operations contributing to visibility impairment in Chaco Culture National Historical Park should the National Park Service Regional Director and the Director of the New Mexico Environmental Improvement Division agree that such impairment is significant and attributable to the lessee's operations. This determination shall be primarily based on visibility monitoring data but may include other proven techniques.

Discussion: Chaco Canyon is a valuable resource, and the protection of it is important to many citizens. Numerous coal leases are located within 10 miles of the park. The possibility exists that coal dust from mining operations or fugitive dust from associated operations such as haul roads may impair visibility in the park. For a fugitive dust source, the ability to predict visibility impairment before operation is limited. However, post-construction monitoring in combination with other techniques could identify the occurrence of impairment and the source of the problem.

*Mitigation Measure: If the coal lease is within 50 km of an adjoining state, the lessee shall notify the appropriate air quality control agency of that state of its construction and operation plans.

Discussion: Neighboring states should be allowed to comment on any impact a source in an adjacent state may have on their air quality.

Introduction: The modeling procedures for air quality assumed the worst case conditions. Any changes in the assumed conditions would result in lower predictions of ambient air concentrations. The following possible mitigation measures could be applied separately or in any combination to reduce the allowable emissions to a level that would not exceed the ambient standards.

*Mitigation Measure: The lessee may be limited in the configuration and location of mine facilities.

Discussion: The model assumed a worst-case configuration for the mine facilities and pit. This configuration is discussed in PEDC, (1982). This configuration places the mine facilities and the pit adjacent to each other and next to the down wind lease boundary. Limiting the configuration would reduce the ambient air concentration at and beyond the least boundary.

*Mitigation Measure: Require haul roads to be treated to reduce emissions.

Discussion: Each proposed mine will be examined at the mine plan stage to determine the extent of potential emissions that would be produced. If necessary it would be required to treat the haul roads to reduce emissions. The type of treatment would depend on the control needed.

*Mitigation Measure: At the time application is made for an air quality permit, the lessee shall certify to the permitting authority that the best available control technology (BACT) as defined in 40 CFR 52.21 will be installed and maintained in working order on the coal preparation plant and associated stockpiles.

Discussion: BACT is required under PSD for certain 100 ton per year sources. It is reasonable to extend this requirement to this source category given the possibility of rapid growth that may occur. This is also in keeping with our goal of preventing significant deterioration of air quality, and at the same time allowing more industrial growth to occur through implementing good pollution control technology. Typically, coal preparation plants are already utilizing BACT in order to meet the state ambient TSP standard. This measure would ensure that all future plants would use such technology.

PALEONTOLOGY

*Mitigation Measure: The lessee shall be required to conduct an intensive inventory to identify any surface exposed fossils. The lessee in conjunction with the Bureau would be required to participate in coordination and consultation with the scientific community to evaluate fossil significance.

Discussion. This measure if adopted would require mandatory inventories prior to surface disturbance of leased lands and would be in addition to the requirements as described in the standard Coal Lease, Section 31. Special Stipulations, (b) Paleontological Resources - (1), which in part states "the lessee shall contact the Bureau of Land Management to determine whether the authorized officer will require the lessee to conduct a paleontological appraisal of the mine plan and adjacent areas, or exploration plan areas, that may be adversely affected by lease - related activities."

Mitigation Measure: The Bureau could work with the New Mexico Museum of Natural History to ensure that adequate construction monitoring and data-recovery programs were developed and implemented. Development of community education projects to enlist local support for protecting the fossils in place, complemented by more vigorous enforcement of restrictions on off-road vehicle use in areas of rich fossil deposits, private or institutional support for an ongoing paleontological research program in the general EIS Region might also offset losses otherwise incurred.

Discussion. The effectiveness of mitigation is difficult to assess. It is limited by such factors as geologic formation, time constraints, type of paleontological resources and management expertise. The basic requisite for mitigation is to satisfy scientific criteria for the retrieval of paleontological data and material that will compensate in some way for the irretrievable loss of potentially significant fossils during the mining operation.

*Mitigation Measure: No surface coal mining will be allowed within the boundaries of the Fossil Forest. Note: This would require a change in the Land Use Plan.

Discussion: This measure would have the effect of preserving the paleontological resources in situ to allow for long term paleontological research and extraction. However, this mitigation measure is an alternative to the planning decision which requires the Fossil Forest be withheld from mining for up to 10 years, from September 1981, to allow paleontological research and salvage.

WATER RESOURCES

Mitigation Measure: The lessee may not use water for irrigation to promote revegetation unless the water has a specific conductance of < 4000 micromhos and a sodium adsorption ratio of < 18 . The lessee shall maintain a water quality monitoring program to record compliance with this requirement.

Discussion. Water quality is a key factor in achieving revegetation success, and current research indicates that water not meeting these standards will retard revegetation efforts. The same or similar requirements could be imposed when a permit under SMCRA is issued.

*Mitigation Measure: The lessee should obtain a NPDES Permit where required for discharge which may affect surface water quality.

*Mitigation Measure: No mining support facilities will have "direct point source" surface water discharge.

WILDLIFE

Mitigation Measure: The lessee shall initiate the following actions to protect wintering mule deer and elk habitat in the La Plata #1 and #2 tracts.

1. Public access will be prohibited on a yearlong basis through the life of the mine. This includes the prohibition of hunting or recreational use on lease areas by mine employees.
2. Vehicular speed will be controlled to minimize road kills and for safety of operators. Reflectors to warn wildlife at night of approaching vehicles will be installed.

Discussion. Habitat in the La Plata #1 Tract (200 acres) and La Plata #2 Tract (105 acres) are the most critical in the project area because deer and elk find food and shelter in close proximity in a relatively small area.

Mitigation Measure: Fences at coal mine reclamation areas should be retained to enable BLM managers to properly manage post-mining grazing and maintain quality wildlife habitat.

*Mitigation Measure: Siltation ponds to prevent erosion and enhance wildlife habitat at coal mines should be encouraged. Ponds should be maintained to improve livestock and wildlife values following abandonment of the mines.

Mitigation Measure: Hunting on all coal leases should be regulated. Access by off-duty mine employees or others should be controlled.

*Mitigation Measure: All wildlife habitat features, identified by a pre-mining inspection, will be recreated or replaced. These shall include but not limited to: Rock piles, cliffs, raptor nesting, and perching sites, stock ponds, reservoirs, or other aquatic habitats features.

CULTURAL RESOURCES

*Mitigation Measure: The lessee shall take the following actions to protect Pierre's Ruin Community (Nageezi Tract).

1. Surface disturbing activities shall not be conducted within the boundary of Pierre's Ruin.
2. The lessee shall construct a fence in consultation with the surface management agency to restrict vehicular traffic on a yearlong basis from the Pierre's Ruin Community (Nageezi Tract).
3. Underground mining operations shall be conducted in such a manner so as to prevent surface subsidence that would: (1) create hazardous conditions such as potential escarpment failure and landslides, (2) cause damage to surface structures, and (3) damage or alter the topography in the Pierre's Ruin Community boundary.

Discussion. The Pierre Ruin Community is a Chacoan outlier along the Great North Road. It has received national attention through its inclusion as a protection site in the Chacoan legislation (PL 96-550) and its nomination to the National Register of Historic Places. Over 95 percent of the community is intact, providing a valuable resource for future research and visitor interpretation. The National Park Service and Bureau of Land Management are discussing the feasibility of opening Pierre Ruin Community to guided tours from Chaco Culture National Historical Park. This measure if adopted would provide for the protection of 960 acres in addition to the 440 acres provided for in PL 96-550, and agreed to by the RCT.

*Mitigation Measure: The lessee of the Chico Wash South tract shall develop a monitoring plan, approved by BIM, to monitor the affects of blasting on the walls of the historic Azabache Stage Station.

Discussion: The Azabache Station site with appropriate buffer zone is contiguous to the Chico Wash South tract. Close proximity blasting could weaken or crack the walls of this historic structure.

Mitigation Measure: The agency should provide for the identification of sites which may be directly affected by non-surface disturbing, mine-related actions such as blasting or alteration of drainage patterns that may affect sites outside the lease area, with an appropriate plan implemented to ensure the sites' protection.

Discussion: Sites with standing walls or sites located on fragile geologic structures may be directly affected by mine-related blasting. Such sites should be periodically monitored to assess the impacts of blasting operations. Establishment of protective buffer zones or stabilization may be necessary to prevent damage to sites which merit preservation. Measures should be taken to ensure that increased run-off does not affect cultural resources located adjacent to drainages.

WILDERNESS

Mitigation Measure: The lessee shall initiate the following in order to protect the integrity of the Bisti WSA (Bisti #1, 2 and 6 Tract).

1. Mining and reclamation operations will be conducted with a minimum of visual impacts as viewed from 1/4 mile within the Bisti WSA.
2. Construction of berms or other structures will be used as needed to reduce or eliminate visual impacts.
3. Travel by construction and mining employees will be restricted to rights-of-way, access roads and existing public roads.
4. Rights-of-ways and access roads developed for mining/reclamation operations will be located in the Southern portion of the Bisti #6 tract.

Mitigation Measure: No surface coal mining would be allowed in the badlands within the Ah-shi-sle-pah WSA.

RECREATION

Mitigation Measure: If the CDNST is routed through or adjacent to the Star Lake West #2, Gallo Wash #1, Hospah #1, Star Lake #1 or Johnson Trading Post tracts the lessee shall, in conjunction with the surface management agency, provide access along the CDNST to ensure the safety of hikers or other users.

Discussion. Public law 90-543 of October, 1968, established the Continental Divide National Scenic Trail (CDNST) from Mexico to Canada. The actual treadway for the CDNST has not been established, but the basic study route is a corridor 30 miles wide (Woodard, L.L. 1982) (refer to Map 2-4). There is also a zone of concern 50 miles on either side of the Continental Divide. Deliberations are currently under way to move the corridor several miles east of the present location, which would avoid the competitive coal leasing tracts.

*Mitigation Measure: The lessee shall provide vehicular access (all weather) to the Azabache Stage Station upon completion of mining and reclamation (Chico Wash South Tract).

Discussion. Azabache Stage Station is potentially eligible for inclusion on the Register of Historic Places, both for its heritage value and its potential yield of scientific information. The site is an early Anglo- Hispanic homestead and possible stage station circa 1880.

LAND USES

*Mitigation Measure: Surface facilities on La Plata tracts 2 and 4 shall be located to avoid the Animas-La Plata irrigation project.

Discussion: There are approximately 600 acres in the Animas-La Plata irrigation project that overlaps these tracts. This irrigation project is a Bureau of Reclamation project in cooperation with surrounding communities.

TRANSPORTATION

Mitigation Measure: The lessee would be required to construct right-of-way fences along rural roads on which increased traffic results in hazards to livestock as specified by BLM at mine plan stage..

Discussion: Livestock including sheep, goats, and cattle have traditionally grazed in the vicinity of unfenced rural roadways. Injury and loss of livestock could increase with the increased daily traffic. Fencing these roadways would reduce vehicular accidents involving livestock.

*Mitigation Measure: Lessee shall comply with BIA policy for road use on Indian Trust and other Federal lands under its jurisdiction.

SOCIAL AND ECONOMIC FACTORS

Mitigation Measure: The Bureau of Land Management may raise the rentals on PRLAs to the fair-market value and have the State Of New Mexico designate its share of the increased revenues for socio-economic impact assistance.

Mitigation Measure: Rentals and royalties received for lands, with a clouded title, shall be placed in escrow pending resolution of title problems.

AMERICAN INDIAN CONCERNS

Mitigation Measure: Generally add to standard stipulations and all other mitigation measures that are adopted an additional requirement that the lessee is to comply with Navajo Tribal laws and regulations and that decisions on the stipulations are to be made under concurrence with the BIA and/or Navajo Tribe.

Discussion: This measure reflects the view of the Navajo Tribe that its tribal jurisdiction extends to the checkerboard area to the east of the reservation. In some instances Tribal laws and regulations could be applied in a way that would require additional protective measures; in others, Tribal laws and regulations may make no substantive difference. The exact environmental effect of this measure is difficult to determine. As applied in most cases, the question of the Tribe's jurisdiction is a legal issue. The BLM's failure to include stipulations that have been suggested by the tribe does not deprive the Navajo Tribe of any legal jurisdiction that may currently exist.

Mitigation Measure: A BLM-BIA-Navajo Tribal work group has determined that the most acute of the adverse socio-economic and cultural impacts can be minimized through consensual arrangements between Navajo individuals occupying the land to be leased, the lessees and the BIA. Accordingly, BIA will establish a project office in Crownpoint, New Mexico which will facilitate negotiations between Navajo individuals and the lessees. Leasing may be deferred on those tracts where voluntary arrangements cannot be reached.

Mitigation Measure: The lessee shall submit a hiring plan at mine plan stage for exercising a preference in extending job offers to local Navajos who are qualified and shall make training available to interested Navajos according to the lessees needs.

Mitigation Measure: If the lease coincides with a Navajo plant gathering area, the lessee shall contact a local medicine man or conduct an inventory of the gathering area to determine rare plant species that are used by religious practioners and to include seeds of these species in reseeding mixtures for reclamation.

Discussion. A Number of the plant species that are used in religious ceremonies are quite rare and often occur in one or two confined areas. If the plants are not located in the general area of need considerable logistics and expense would be involved to locate and gather the rare plants to continue their religious practices.

Mitigation Measure: Adopt the 17 "demands" of the Navajo Tribe (letter 300 signed by Peterson Zah) with the exception of demand (a) recognizing the tribe as qualified surface owners. All of the other "demands" are adopted as alternative mitigation.

Discussion: These "demands" are located in the published letters in Volume 2 of this EIS. The BLM believes that neither the Navajo Nation nor the individual Navajos which are grazing lessees of public lands can be qualified surface owners as that term is defined in the Surface Mining Control and Reclamation.

Mitigation Measure: Adopt the Memorandum of Understanding #NMSO-110 (signed February 12, 1979) between the BLM, the BIA and the Navajo Tribe which identified the following methods for resolving occupancies on public lands.

1. Voluntary relocation to non-BLM lands;
2. Purchase of the occupant's equities outright;
3. Mandatory relocation to non-BLM lands;
4. Purchase of BLM lands;
5. Purchase of non-BLM lands;
6. Exchange;
7. Lease;
8. Life estate;
9. Permit (license);
10. Temporary relocation until mining and rehabilitation is completed;
11. Stipulation in future mineral leases to require mining companies to handle;
12. Relocation to land in the Navajo-Malpais exchange;

Mitigation Measure: If lease contains occupied dwellings (farmsteads, grazing lands, etc.) an area within 300 feet of the exterior boundaries of the occupied land is unsuitable for surface coal mining unless the lessee receives written permission from the occupant or owner allowing surface coal mining operations and approval of such permission by the Area Director, Bureau of Indian Affairs, Navajo Area Office. In addition, the lessee shall provide for ingress and egress to the occupied land. Where the lessee and the occupant

desire to conclude a relocation agreement, they may call upon the Eastern Navajo Agency, Bureau of Indian Affairs, to facilitate relocation arrangements.

Mitigation Measure: Unauthorized Occupants: The lessee is responsible for the costs of relocation as specified in this section.

- A. The lessee shall pay to each family listed as being unauthorized occupants:
 - 1. The fair market value of the dwelling and other improvements such as corrals, and fences that will be displaced by mining.
 - 2. Actual reasonable expenses for moving, including actual reasonable expenses for looking for a replacement farm or ranch and direct losses from a business or ranch operations, as determined by using 41 CFR Subpart 114-50.6 as a guideline.
 - 3. A replacement housing payment not to exceed \$15,000 to be computed using 41 CFR Subpart 114-50.8 as a guideline.
- B. In lieu of the payments in paragraphs A #1-2 of this section, the displaced person may accept:
 - 1. \$500 in lieu of moving payments;
 - 2. \$500 in lieu of payments for expenses of searching for a new farm or ranch.
- C. The lessee, through a reimbursable agreement with the Bureau of Indian Affairs, shall provide Relocation Assistance Advisory Services, as provided in 41 CFR 114-50.4.
- D. No family who will become displaced will be required to surrender possession of their property before payment is made to them or deposited in trust for them with the Bureau of Indian Affairs. In all cases, the affected family shall be given at least 90 days written notice of the date by which the family is required to move from the acquired property.
- E. No family shall be required to move unless the lessee has shown, to the BLM satisfaction, the availability of comparable replacement housing as defined in 41 CFR 114-50.201 (d)

Value Determination

- A. All real property must be appraised prior to initiation of negotiations.
- B. Lessee must give the owner or his representative an opportunity to accompany the appraiser during his inspection of the property.

Just Compensation

In no case will the amount established as just compensation be less than the approved appraisal of the estimated fair market value of the property.

The lessee will provide the owner of the property with a written statement of the amount established as just compensation. The summary statement shall include the following:

- A. Identification of the real property and the estate or interest therein to be acquired.
- B. Identification of the buildings, structures and other improvements considered to be part of the real property for which the offer of just compensation is made.
- C. A statement explaining the basis for the determination of just compensation and that such determination:
 1. Is based on the estimated fair market value of the property.
 2. Is not less than the approved appraisal of the property.

In cases where the mining of coal would leave the owner of the property with an uneconomical remant, the lessee shall offer to acquire the entire property.

Discussion: This mitigation measure has been proposed at BIA's suggestion and would be used in place of the current proposed term for unauthorized occupants. This provision is based on the standards which would apply if the relocations qualified for assistance under the Uniform Relocation Assistance Act and tries to be consistent with the Navajo Tribe's Impact and Resettlement Policy and Plan. Although the BLM feels these standards are not legally required, they are an option. The major differences between this stipulation and the proposed stipulation are that this one provides for a relocation advisory service, gives compensation for lost farming and ranching income, and sets definite standards for the quality of the replacement housing. Similar types of procedures were used to move Navajos living in the area of the Navajo Irrigation Project, a 110,000 acre farming endeavor by the Navajo Tribe that resulted in the relocation of Navajo families in the same general area.

UNAVOIDABLE ADVERSE IMPACTS

The same resources identified with unavoidable impacts in Preference Right Lease Issuance (PRLI) and Bypass Alternative would also be affected in the PRLA alternative and in the MSOC, Target, and High alternative but the impacts would be commensurate with the level of mining. Because of this, the reader is referred to the narrative in the PRLI and Bypass alternatives. The discussion of unavoidable adverse impacts is limited to impacts that can not be mitigated during mining and would remain during the life of the mine and/or after mining and reclamation operations are completed.

PREFERENCE RIGHT LEASE ISSUANCE

A short-term increase in TSP would occur because of surface mine disturbance and traffic increases on unpaved roads. The increased population would cause an increase in the emission of all NAAQS pollutants.

Soil productivity would be lost and regained periodically (regular intervals) on approximately 22,020 acres during the life of the mines. An unquantified amount of soil would be lost from disturbed areas prior to reclamation or revegetation. Local intense thunderstorms, summer and spring, would result in high runoff events causing further degradation of surface soils through water erosion. Soil disturbance during the life of the mines would result in wind erosion. Removal and handling operations would cause a loss of topsoil and destruction of soil structure. Incorporation of clay and silt material from the subsoils would cause degradation to shallow loamy topsoils. The productive capacity of the soils involved would be decreased from the complete destruction of the natural soil profiles and from the impacts to the soils properties which determine moisture regime and fertility.

A portion of 1,137 fossil localities of the late Cretaceous Crevase Canyon, Menefee, and Kirtland/Fruitland formations could be destroyed or damaged during mining activities. Fossils of these formations are generally vertebrate fossils of dinosaurs and early mammals. A portion of an estimated 1,000 + predicted cultural sites of the prehistoric and historic human record of the San Juan Basin could be unavoidably destroyed. Increased losses through illegal collection or vandalism would also be unavoidable. The data from these cultural resources would be lost. The portion of any site not included in further data recovery would be destroyed by surface disturbance, and the data contained in it would be lost.

Harassment and shooting of animals due to increased human activity in the area and loss of wildlife habitat from mining and related construction activities would occur. One prairie falcon, 5 ferruginous hawks, and nesting sites could be disturbed or disrupted due to mining activities.

Adverse effects to the scenic viewshed and interpretation of Chaco Culture NHP's relationship to the designated Chacoan outliers would be unavoidable.

Noise, increased traffic and industrial activity would have adverse effects on visitor experience at CCNHP and on visitors as they travel to the park.

Temporary loss of 20,020 acres of native vegetation and wildlife habitat and 2,032 AUM's of forage for livestock for the length of the mine or until reclamation is completed would be unavoidable due to mining.

Significant increases in traffic in the San Juan Basin would cause traffic congestion, increased accidents (89 in 2000) and road kills (including livestock) and a demand for more and better road maintenance.

Capital and operating expenditures of local counties, school districts, and municipalities would rise as a result of the need to expand public

facilities and assure adequate funding, there would be at least a temporary deterioration in the quality of services, causing inconvenience and dissatisfaction among those affected.

Population increase in the region and subsequent increase in demand for recreation could result in over utilization and crowding of existing recreation development; Chaco Cultural National Historical Park, Navajo Lake, San Juan River, Angel Peak, Wilderness Study Areas. Noise associated with mining activities and the destruction of scenic natural land forms would distract from the quality of the recreational experience in the nationally known and visited Bisti and De-na-zin WSAs.

Thirty-nine Navajo families could be relocated. These and many other Navajos living in the area would experience significant impacts on their traditional lifestyle through the influx of non-Indians into the area. Mining could disrupt the use of an unknown number of sacred and gathering areas for materials used in religious ceremonies. Eleven grave sites could be destroyed. Traditional Navajo lifestyles, of grazing livestock, could be disrupted or destroyed for the life of the mine, if relocation or settlement was not satisfactorily administered.

PRLA ALTERNATIVE I: EXCHANGE OR LEGISLATION

a. Total Exchange or Legislation

There would be no unavoidable adverse impacts associated with this action.

b. Exchange or Legislation for Selected PRLAs

Unavoidable adverse impacts associated with mining this alternative would generally be the same type as those identified under the Preference Right Lease Issuance Alternative but will be considerable less and with the following exceptions.

Destruction of overlying strata, and a periodic loss and regaining of soil productivity could occur on approximately 15,435 acres, and subsidence could occur on up to 28,270 acres.

A portion of an estimated 1,076 fossil locality of the late Cretaceous Crevasse Canyon, Menefee and Kirtland/Fruitland formation could be destroyed or damaged during mining activities.

Temporary loss of 15,435 acres of native vegetation and wildlife habitat and 1,778 AUMs of forage for livestock grazing for the length of the mine or until reclamation is completed would be unavoidable.

A portion of approximately 434 predicted cultural sites of the prehistoric and historic human record of the San Juan Basin could be unavoidably destroyed.

Increase in traffic in the San Juan Basin would cause traffic congestion, increased accidents (as high as 89 by the year 2000) and road kills (including livestock) and a demand for more and better road maintenance.

Population would increase by approximately 1,900 people in Cuba in the year 2000. Housing needs would also increase by approximately 680 units in Cuba in the year 2000.

Approximately fourteen Navajo families could be relocated, eleven grave sites and four sacred sites could be disturbed under this action and cannot be avoided.

BYPASS ALTERNATIVE

Unavoidable adverse impacts associated with mining this alternative would generally be the same type as those identified under Preference Right Lease Issuance, with the following exceptions.

A portion of 271 fossil localities of the late Cretaceous Crevase Canyon, Menefee and Kirtland/Fruitland formations could be destroyed or damaged during mining activities.

Soil productivity would be lost and regained periodically (regular intervals) on approximately 6,130 acres during the life of the mines. An unquantified amount of soil would be lost from disturbed areas prior to reclamation or revegetation.

Temporary loss of 6,130 acres of native vegetation and wildlife habitat and 603 AUM's of forage for livestock for the length of the mine or until reclamation completed would be unavoidable due to mining. Actual availability of the reclaimed area for grazing would depend upon the procedures and time frames specified for reclamation in a mine plan and the success of the procedures used to reclaim the area.

Harassment and shooting of animals could occur due to increased human activity in the area, and wildlife habitat might be lost. One ferruginous hawk and nesting site could be disturbed or disrupted due to mining activities.

A portion of 165 to 188 predicted cultural sites of the prehistoric and historic human record of the San Juan Basin would be unavoidably destroyed.

Sites disturbed or destroyed through unauthorized excavation, collection or other disturbances would lose a portion of their data. Monitoring, surveillance, fencing, and other protective means cannot prevent all unauthorized activities. All sites destroyed would lose their potential for visitor interpretation.

Solitude in the Bisti Wilderness Study Area would be disrupted by noise due to mining of Bisti #6. The recreational experience of hikers on the

CDNST could be disturbed due to the noise level and destruction of natural landforms if the trail is actually routed through any of these tracts. Surface mining of Bisti #4 would destroy part of the scenic recreation area known as the fossil forest.

An estimated increase of one traffic accident in the year 2000 and five accidents are projected in the region.

Approximately four Navajo families could be relocated, three grave sites and one sacred site could be disturbed under this alternative and can not be avoided.

MINIMUM SURFACE OWNER CONFLICTS ALTERNATIVE

Unavoidable adverse impacts associated with mining this alternative would generally be the same type as those identified under Preference Right Lease Issuance and Bypass Alternative, with the following exceptions.

Destruction of overlying strata, and a periodic loss and regaining soil productivity could occur on approximately 19,302 acres, and subsidence could occur on up to 21,000 acres.

A portion of an estimated 136 fossil locality of the late Cretaceous Crevase Canyon, Menefee and Kirtland/Fruitland formation could be destroyed or damaged during mining activities.

Temporary loss of 19,302 acres of native vegetation and wildlife habitat and 4,268 AUMs of forage for livestock grazing for the length of the mine or until reclamation is completed would be unavoidable.

Potential disturbance on 200 acres of wintering mule deer and elk range due to mining activities for the life of the mine.

A portion of 600 to 708 predicted cultural sites of the prehistoric and historic human record of the San Juan Basin could be unavoidably destroyed.

In 1987, an estimated two accidents and in the year 2000 an estimated 11 accidents would be unavoidable in the region.

Population would increase by about 1,827 in the Grants area by 1987 and 2,977 in the year 2000. An increase in housing needs would not be a significant result of new competitive coal leasing.

Approximately 23 Navajo families could be relocated.

TARGET ALTERNATIVE

Unavoidable adverse impacts associated with mining this alternative would generally be the same type as those identified under Preference Right Lease Issuance and Bypass Alternative, with the following exceptions.

Destruction of overlying strata, and a periodic loss and regaining of soil productivity could occur on approximately 35,977 acres, and subsidence, could occur on up to 21,000 acres.

A portion of an estimated 1,400 fossil localities of the late Cretaceous Crevasse Canyon, Menefee and Kirtland/Fruitland formation could be destroyed or damaged during mining activities.

Temporary loss of 35,977 acres of native vegetation and wildlife habitat and 6,045 AUM's of forage for livestock grazing for the life of the mine or until reclamation is completed would be unavoidable.

Two ferruginous hawks', and one golden eagle and their nesting sites could be disturbed or disrupted due to mining activities for the life of the mine. Potential disturbance on 200 acres of wintering mule deer and elk range due to mining activities for the life of the mine.

A portion of 814 to 1,105 predicted cultural sites of the prehistoric and historic human record of the San Juan Basin could be unavoidably destroyed.

In 1987, an estimated 7 accidents and in the year 2000 an estimated 32 accidents would be unavoidable in the region.

Population would increase by about 859 in the Cuba, and 3,525 in Milan in the year 2000. Housing needs would increase by about 307 units in Cuba in 2000.

Approximately 70 Navajo families could be relocated, and a portion of 23-33 grave sites and three sacred areas could be destroyed due to mining activities.

HIGH ALTERNATIVE

Unavoidable adverse impacts associated with mining this alternative would generally be the same type as those identified under Preference Right Lease Issuance and Bypass Alternative, with the following exceptions.

Destruction of overlying strata, and a periodic loss and regaining of soil productivity on approximately 68,641 acres and subsidence could occur on up to 37,081 acres.

A portion of an estimated 1,693 fossil localities of the late Cretaceous Crevasse Canyon, Menefee and Kirtland/Fruitland formation could be destroyed or damaged during mining activities.

Temporary loss of 68,641 acres of native vegetation and wildlife habitat and 9,977 AUM's of forage for livestock grazing for the length of the mine or until reclamation is completed would be unavoidable.

Two ferruginous hawks, and one golden eagle and their nesting sites could be disturbed or disrupted due to mining activities for the life of the mine. Potential disturbance on 300 acres of wintering mule deer and elk range due to mining activities for the life of the mine.

A portion of 1,727-2,295 predicted cultural sites of the prehistoric and historic human record of the San Juan Basin would be unavoidably destroyed.

Noise and visual impacts upon the wilderness character of Ignacio Chavez WSA as a result of surface mining of Chico Wash South would be unavoidable.

In 1987, an estimated 13 accidents and in the year 2000 about 64 accidents would be unavoidable in the region.

Population would increase by approximately 2,573 in Cuba, 4,230 in Grants and 5,481 in Gallup, 4,230 in Milan, and 3,342 in Crownpoint/Thoreau. Housing needs could increase by 946 units in Cuba, 1,528 units in Grants, 1,965 units in Gallup, and 1,164 units in Crownpoint/Thoreau due to new federal coal leasing.

Approximately 455 Navajo families could be relocated, and a portion of 25-35 grave sites and four sacred areas could be destroyed due to mining activities for an indefinite period of time.

RELATIONSHIP BETWEEN SHORT-TERM USE AND LONG-TERM PRODUCTIVITY

The same type of relationship between short-term use and long-term productivity in Preference Right Lease Issuance would occur in the PRLA alternative as well as the four competitive leasing alternatives. However, the difference in magnitude would be commensurate with the level of mining. The reader is referred to the narrative in Preference Right Lease Issuance for the type of impacts that would occur in the remaining alternatives.

PREFERENCE RIGHT LEASE ISSUANCE

At each mine, "deep" wells would be drilled and developed for short-term use for mining operations. After mining ceased, these wells could be transferred to the surface owner and used for livestock and possibly domestic purposes if the water quality was good enough. This short-term use for mining operations would represent an enhancement of the long-term productivity of the water resource by providing a more reliable water supply for the area. Appropriation of ground water for these uses is under the jurisdiction of the New Mexico State Engineer.

Surface and underground mining (short-term) would cause soil disturbance, soil loss, and loss of soil productivity on approximately 47,020 acres. The acreage remaining after reclamation or revegetation would be returned to livestock grazing, wildlife uses and non-coal mineral activities. Reclamation or revegetation success (short-term) would determine long-term productivity and uses. If revegetation is successful grazing will continue and could be enhanced. If not, long term grazing productivity, from what it was, would be less. Thirty-nine families would have changes in their lifestyles.

Coal development would cause long-term changes in lifestyles, cultural and religious values for an unknown number of Navajo families living on or near the area.

There would be positive long-term impacts on productivity through: (1) an increase in the size of the labor force; (2) infrastructure improvements useful for commercial and industrial development; and (3) increased income and buying power which would contribute to the development of a larger and more diversified trade and services sector. There would also be one potential negative impact on productivity, i.e., an increased vulnerability to economic disruptions caused by fluctuations in the coal industry.

There would be a shift in the long-term from a remote rural area to more populated industrialized one. The short-term increase in population would result in expansion of community infrastructure in the long-term.

PRLA ALTERNATIVE I: EXCHANGE OR LEGISLATION

a. Total Exchange or Legislation

In the short-term coal resources (approximately 350 million tons) underlying the fossil forest and Ah-shi-sle-pah WSA would be unavailable for mining. In the long term these lands would be available to allow prolonged, periodic scientific study of the lands and would result in long-term preservation of the wilderness, visual, paleontological, cultural, and recreational values located within these lands.

b. Exchange or Legislation for Selected PRLAs

Surface mining would disturb 15,435 acres. Approximately fourteen families would have changes in their lifestyles.

BYPASS ALTERNATIVE

Surface mining would disturb 6,130 acres. Approximately four families would have changes in their lifestyles.

MINIMUM SURFACE OWNER CONFLICTS ALTERNATIVE

Surface mining would disturb 19,302 acres. Approximately 23 families would have changes in their lifestyles.

TARGET ALTERNATIVE

Surface mining would disturb 35,977 acres. The lifestyles of approximately 70 families would be changed.

HIGH ALTERNATIVE

Surface mining would disturb 68,641 acres. The lifestyle of approximately 455 families would be changed.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

The same type of irreversible and irretrievable commitments of resources in Preference Right Lease Issuance would occur in the PRLA alternative as well as the four competitive leasing alternatives. However, the difference in magnitude would be commensurate with the level of mining. The reader is referred to the narrative in Preference Right Lease Issuance for the type of impacts that would occur in the remaining alternatives.

PREFERENCE RIGHT LEASE ISSUANCE

The coal that is mined would be irretrievable, and approximately 50% (241.9 million tons) of coal that is mined by underground methods and 15% that is surface mined would be unrecoverable by present technology.

Some of 1,137 estimated fossils localities of the late Cretaceous, Crevasse Canyon, Menefee, and Kirtland/Fruitland formations and associated data would be destroyed and irreversibly lost. The Kirtland/Fruitland contains an unparalleled record of one of the most important episodes in history, the abrupt impacted or removed through unauthorized, collection, vandalism, or destruction would be irreversibly and irretrievably lost.

Alteration of the present landscape in surface mined areas would be irreversible and irretrievable. Water consumed each year for the mining and reclamation operations would be irretrievably lost to other uses. Destruction of shallow ground-water sources presently yielding water to shallow wells through surface mining would be an irreversible commitment of these known resources.

A few of the over 542 predicted cultural sites would be destroyed and irreversibly and irretrievably lost. Most sites would be salvaged through excavation, however testing or further recordation would lose scientific value that may have been available with future archaeological techniques. Cultural resources impacted or removed through unauthorized collection, vandalism or destruction would be irreversibly and irretrievably lost.

Surface mining of scenic badlands would irretrievably destroy the scenic, recreational and scientific values of these areas through alteration of unique natural land forms.

Human fatalities and permanent injuries caused by traffic and mining accidents would be irreversible and irretrievable.

Opening up the region with paved roads and introducing a large-scale industrial economy would produce irreversible changes in traditional Navajo lifestyle, from one of traditionally rural to mining and industrial.

Any grave sites and sacred areas that are destroyed would be irreversibly and irretrievably lost.

PRLA ALTERNATIVE I: EXCHANGE OR LEGISLATION

a. Total Exchange or Legislation

There would be no irreversible or irretrievable commitment of resources associated with this action.

b. Exchange or Legislation for Selected PRLAs

Some of the estimated 1,076 fossil localities and 434 cultural sites would be irretrievably lost.

Surface mining of scenic badlands would irretrievably destroy the scenic, recreational and scientific values of these areas through alteration of unique natural land forms.

BYPASS ALTERNATIVE

Some of the estimated 271 fossil localities, and 165 to 188 plus cultural sites would be irretrievably lost.

Surface mining of scenic badlands would irretrievably destroy the scenic, recreational and scientific values of these areas through alteration of unique natural land forms.

MINIMUM SURFACE OWNER CONFLICTS ALTERNATIVE

If only the tracts in the Minimum Surface Owner Conflicts Alternative are selected for lease sale, coal in six of the eight Bypass tracts would be irreversibly lost.

Some of the estimated 136 fossil localities, and 600 to 708 cultural sites would be irretrievably lost.

TARGET ALTERNATIVE

Some of the estimated 1,400 fossil localities, and 814 to 1,105 cultural sites would be irretrievably lost.

Surface mining of scenic badlands on the Bisti #2, #4, and #6 tracts would be irretrievably destroy the scenic, recreational, and scientific values of these areas through alteration of unique natural landforms.

HIGH ALTERNATIVE

Some of the estimated 1,603 fossil localities, and 1,727 to 2,295 cultural sites would be irretrievably lost.

Surface mining of scenic badlands on the Bisti #2, #4, and #6 tracts would be irretrievably destroy the scenic, recreational and scientific values of these areas through alteration of unique natural landforms.

CHAPTER 4

CONSULTATION AND COORDINATION

CHAPTER 4

CONSULTATION AND COORDINATION

The initial sections of this chapter are devoted to consultation and coordination during the preparation and review of the Draft Environmental Impact Statement (DEIS) published on October 1983. This document includes the letters, responses and text revisions resulting from comments received on the Second Draft.

Opportunity for early involvement and cooperation in the environmental process was provided to numerous agencies. This involvement occurred through formal agreement or via an informal information exchange. The Federal Department of the Interior agencies that have been contacted include the following: Bureau of Indian Affairs (BIA) (formal agreement), Fish and Wildlife Service (FWS), Office of Surface Mining (OSM), and United States Geological Survey (USGS), Water Resources Division (formal agreement).

Letters were sent to each of these agencies requesting specific information. The letters requested that a single named contact be established for each agency; this contact has been kept informed on the development of the EIS and thus has acted as an information channel for those agencies.

The USGS submitted information on surface water and some data on underground water. The BIA's input was mostly on a consultation basis regarding wildlife, Navajo concerns, cultural resources, and the unsuitability of certain lands for coal mining, the BIA also provided maps and information about grazing allotments, forage allocation, allotment owners, range improvements and surface ownership in the regions of competitive coal leasing. The BLM's Minerals Division provided coal resource information and, along with the OSM and the FWS, has provided input into this DEIS through review and informal consultation as requested.

CONSULTATION AND COORDINATION

SCOPING MEETINGS

Beginning early in 1981, the BLM conducted a series of 16 scoping meetings with other Federal, State and local agencies, the Navajo Tribe, and the general public. The purpose of these meetings was to gather information regarding the concerns of these groups on the various projects that are proposed in the San Juan Basin.

An initial mailing was made to over 3,000 agencies and individuals to distribute information about the proposals and to announce scoping meetings to the public. A follow-up mailing of nearly 2,000 letters was made to those who expressed an interest, reminding them of the meetings. These meetings were announced in the Federal Register, news releases, and radio spots in both the English and Navajo languages.

Public participation activities sponsored by the BLM have also been used to obtain input from rural residents of the potentially strippable coal zone. Because these people are primarily Navajos living in relatively isolated areas who to some degree are ineffectively represented by conventional political systems, some parts of the public involvement effort were tailored to their needs.

During earlier stages of the planning process, "open houses" were held at Pueblo Pintado, Nageezi, Crownpoint, Lake Valley, Gallup, Grants, Farmington, and Albuquerque to receive input from the public. Field interviews were conducted, and an active outreach program was carried out over a 16-month period, responding to requests from groups for presentations on the issues involved. The BLM also distributed an information sheet on work in progress and a pamphlet ("Coal in the Chaco-San Juan") that included a mail-back comment form.

Special opportunities were provided to allow public input on what the BLM's land use recommendations should entail. Called "public brainstorming sessions," these meetings produced some suggestions that have been reflected in the BLM recommendations presented here.

Opportunities for public review of this planning effort in its later stages were also established, including open houses in Pueblo Pintado, Lake Valley, Huerfano, Farmington, Albuquerque, and Taos. Attendance at these open houses was approximately 1,300 individuals; 326 letters were also received. Much of this public input was responsible for the recommendations and changes made during the land use planning process.

SURFACE OWNER CONSULTATION

The Surface Mining Control and Reclamation Act (SMCRA) of 1977 requires consent to be obtained from qualified surface owners prior to the surface mining of Federal coal under privately owned surface. Written consent is required prior to the lease sale (30 USC 1201; 91 Stat. 445). The Preference Right Lease Application (PRLAs) predate passage of SMCRA, so surface owner consent is not required for surface mining on the PRLAs. However, this consent is required on the competitive tracts. As an initial step in determining the views of potentially qualified surface owners, the Farmington Resource Area Office mailed out 1,143 certified letters to owners of 130 individual allotments. (Refer to Appendix H for the text of this letter.) Fifty-four of these allotments are held in individual ownership and 76 are held in multiple heirship.

In a letter to the BLM dated November 21, 1981, the Chairman of the Navajo Tribal Council stated that the Council's position is that the Navajo Nation fulfills the requirements as a qualified surface owner for trust and fee lands of the Navajo Nation and for lands on which the Nation holds State or Federal grazing leases. The Council has also taken the position that Navajos residing on lands withdrawn for Indian use under P.L.O. 2198 (refer to the Glossary) are qualified surface owners. The BLM State Director responded to this letter on December 24, 1981, explaining that neither the tribe nor individual Navajos living on P.L.O. 2198 lands were qualified surface owners under the definition of 43 CFR 3400.0-5 (1980). The Navajo Tribe has not responded to this letter.

Various views toward proposed surface mining have been expressed in writing by individual Navajos and Navajo governmental bodies, some of whom may be found to be qualified surface owners within the meaning of SMCRA. The BLM has received 240 responses to the certified letters that were mailed. Of this number, 180 reflect a willingness to allow the Federal government to include their lands for future coal development, 41 oppose the inclusion of their lands, and 19 are unsure. The Navajo Tribe has refused consent for surface mining. Seven chapters have also expressed opposition, including Little Water, Nageezi, Huerfano, Torreon, Lake Valley, Ojo Encino and Pueblo Pintado; and a similar position has been expressed by the Chaco Lejin Energy and Resource Committee.

REVIEW OF THE DEIS

This section briefly outlines the steps taken to ensure that the public was provided an adequate opportunity to participate in the DEIS comment process.

Comments on the DEIS were requested from the government agencies listed in Table 4-1 as well as special interest groups and members of the general public.

FORMAL PUBLIC HEARINGS

Public hearings were scheduled to provide a forum for oral testimony on the DEIS and Second DEIS. The public was informed of these hearings through notice in the Federal Register, news releases, and postings of specific hearing dates.

Table 4-2 summarizes the dates, locations, attendance, and number of individuals who testified at these hearings. Due to their extensive length, hearing transcripts are not reproduced here, but the complete transcripts are available for public inspection at the Albuquerque District Office, Farmington Resource Area Office and New Mexico State Office in Santa Fe.

The U.S. House of Representatives Interior Subcommittee on Mining, Forest Management, and Bonneville Power held a field hearing in Santa Fe, New Mexico on May 21, 1983. The transcripts of testimony received at that hearing are available for public inspection at the Albuquerque District, Farmington Resource Area and the New Mexico State Office in Santa Fe. These transcripts are a part of the administrative record of this EIS.

OPEN HOUSES

A series of five informal open houses were scheduled to provide a forum for informal review and solicitation of questions or comments on the DEIS or other coal development related topics.

Table 4-3 summarizes the dates, locations and attendance at the various open houses. The comments received are not reproduced here, but are available for public inspection at the Farmington Resource Area Office. Responses to substantive comments are handled through responses to the individual comment letter found in the Second Draft EIS.

DOCUMENT RECIPIENTS

Federal Government

Department of Agriculture
 + *Soil Conservation Service
 + *U.S. Forest Service

Department of the Army
 *Corps of Engineers
 +Department of Commerce/NOAA
 Department of Energy

+ *Department of Housing and Urban Development

Department of the Interior

+ *Bureau of Indian Affairs
 *Bureau of Mines
 *Bureau of Reclamation
 *Minerals Management Service
 + *National Park Service
 + *Office of Surface Mining, Reclamation
 and Enforcement
 + *U.S. Fish and Wildlife Service
 + *U.S. Geological Survey

Department of Labor

Department of Transportation

+ * Environmental Protection Agency

Tribal Government

+ *Navajo Nation

*Presidents, Navajo Off-Reservation Chapters
 Crownpoint
 Huerfano
 Lake Valley
 Little Water
 Nageezi
 Ojo Encino
 Pueblo Pintado
 Torean

*Director, Navajo Tribal Land Administration

Local Government

San Juan Regional Committee

County Commissions
 McKinley County
 Sandoval County
 *San Juan County

+McKinley County
 Planning Department
 Soil and Water Conservation District

Local Government (Cont'd)

Sandoval County
 Planning Department
 Soil and Water Conservation District

*San Juan County
 Planning Department
 Soil and Water Conservation District

State Government

+ *State of New Mexico

+ Attorney General

+ *Bureau of Mines and Mineral Resources

*Commerce and Industry Department
 Economic Development Division

+ *Department of Finance and Administration
 Planning Division
 Coordination/Clearinghouse
 Bureau
 Historic Preservation Bureau
 State Historic Preservation
 Officer

+ *Energy and Minerals Department
 Mining and Minerals Division
 Coal Surface Mining Bureau

*Governor Bruce King

+ Governor Tony Anaya

+ *Health and Environmental Department
 Environmental Improvement Division

+ *Highway Department

*Land Office

+ *Natural Resource Department
 Department of Game and Fish
 Soil and Water Conservation Division
 Water Resources Division
 State Engineer

+ Transportation Department

Other States

Arizona Clearinghouse
 Colorado Clearinghouse
 Utah Clearinghouse

* Agencies that provided comments on the DEIS.

+ Agencies that provided comments on the Second DEIS.

TABLE 4-2

SUMMARY OF PUBLIC HEARINGS ON THE
DRAFT SAN JUAN RIVER REGIONAL COAL ENVIRONMENTAL IMPACT STATEMENT

DATE	TIME	LOCATION	ATTENDANCE	NUMBER TESTIFYING
10 January 1983	1:00 p.m.	Crownpoint	130	25
12 January 1983	9:00 p.m.	Farmington	115	34
14 January 1983	9:00 a.m.	Albuquerque	200	58
14 March 1983	9:00 a.m.	Santa Fe	80	29
17 March 1983	10:00 a.m.	Pueblo Pintada	200	33
8 November 1983	10:00 a.m. & 7:00 p.m.	Farmington	<u>70</u>	<u>27</u>
TOTALS			795	200

TABLE 4-3

SUMMARY OF INFORMAL OPEN HOUSES

DATE	TIME	LOCATION	ATTENDANCE
14 December 1982	3:00 p.m.	Albuquerque	50
14 December 1982	3:00 p.m.	Farmington	120
15 December 1982	3:00 p.m.	Crownpoint	150
16 December 1982	3:00 p.m.	Gallup	60
16 December 1982	3:00 p.m.	Taos	50
TOTAL			380

CHAPTER HOUSE MEETINGS

At the request of the Chapter officials, concerned publics and special interest groups, a series of informal Chapter House meetings was scheduled. The intent of these meetings was to provide an informal review of the Coal EIS, solicit comments on the DEIS and to provide information regarding surface owner qualification determination, surface owner consent and refusal to consent.

Table 4-4 summarizes the dates, locations and attendance at the various meetings. The comments received from the public are not reproduced here, but are available for public inspection at the Farmington Resource Area Office. Responses to substantive comments were made to individual letters in the Second Draft EIS.

WRITTEN RESPONSES

In addition to the oral and written comments received from the above described meetings, a large number of comments were received based upon the mailing of approximately 1,700 copies of the Second Draft to various Federal, State and local agencies, Indian Tribes, special interest groups and the public in general. Table 4-5 lists those individuals or groups who commented on the San Juan River Regional Coal EIS. Approximately 43 individuals, not in attendance at the formal hearing held in Farmington submitted comments on November 8, 1983.

SUMMARY OF COMMENTS

The following is a brief summary of the written and oral comments received on the Second DEIS. Federal agencies generally found the document to be adequate, however, several agencies contributed additional information on mineral resources, air quality, wildlife and cultural resources which they believed should be included before a decision is reached.

New Mexico State agencies suggested staged leasing of PRLAs and two stages of competitive leasing at least one year apart. Other concerns centered around continual determination of Fair Market Value, determination of commercial quantities, geologic and paleontological resources, and irreversible impacts to Native Americans.

Local government concerns and comments generally reflected a positive attitude toward development of the coal resource; however, concern was expressed with the potential impacts to social services and public facilities.

The Navajo Tribe, BIA, Chapter officials and local Navajo populous have expressed numerous concerns as well as opposition against coal development. Comments reflect concerns on the effects of development upon traditional Navajo religion, increases in population, the cost of living, social service needs, job preferences for Navajos, and hardships of family relocation. Several legal issues have also been raised with regard to mineral and water rights in the San Juan Basin, qualified surface owner determinations, Navajo-Hopi Indian Relocation Amendments Act of 1980, Uniform Relocation Assistance Act, the American Indian Religious Freedom Act, issuance of PRLAs, and proposed land exchanges.

TABLE 4-4

SUMMARY OF INFORMAL SURFACE OWNER
CONSULTATION MEETINGS

DATE	LOCATION	ATTENDANCE
27 December 1982	White Rock	60
13 January 1983	Crownpoint	28
14 January 1983	Crownpoint	32
17 January 1983	Redrock	16
19 January 1983	Ojo Encino	19
21 January 1983	Huerfano	81
23 February 1983	Redrock	40
2 March 1983	Ojo Encino	11
3 March 1983	Huerfano	21
4 March 1983	Crownpoint	7
*11 April 1983	Lake Valley	25
*21 April 1983	Counselor	<u>35</u>
		TOTAL 375

*Meeting was requested after the April 8, 1983 comment period.

TABLE 4-5

LIST OF COMMENTORS

Number	Commentors	Date	Comments	Purpose and Need	Author- izing Actions	Alter- natives	Recla- mation/ Soils	Affected Environ- ment	Environ- mental Impacts	Miti- gation	Realty	Vege- tation	Wild- life
1.0	McKinley County	101483	Yes										
2.0	James V. Lewis	101383	No										
3.0	Ray Margo, Jr./USFS	112083	No										
4.0H	Bert Mesal	110883	Yes										
5.0H	Ike Halliday	110883	Yes	X									
6.0H	Hank Pohlman	110883	No										
7.0H	Judy Stoiz	110883	No										
8.0H	Paul Fyfe/DNA	110883	Yes	X					X				
9.0H	Donna Snyder	110883	Yes										
10.0H	Allison Monroe/SWRIC	110883	Yes	X		X							
11.0H	Klara Kelley	110883	Yes									X	
12.0H	Illian Tenopyr	110883	Yes	X			X						
13.0H	John Redhouse	110883	No										
14.0H	Jerry DeGront/BIA	110883	Yes									X	
15.0H	Ike Beyale	110883	No										
16.0H	F. Sandoval/Huerfano	110883	No										
17.0H	Elliott Riggs	110883	Yes										
18.0H	Don Mosley/Utah Int	110883	Yes				X						
19.0H	John Cole/1st Nat'l	110883	No										
20.0H	Ed Goff	110883	No										
21.0H	Carol Garner/CCA	110883	Yes	X									
22.0H	Dr. Robert Williams	110883	Yes										
23.0H	Dr. E. Matthews/CCA	110883	Yes				X						
24.0H	J. Hornbeck/Celsius	110883	No										
25.0	Willie H. Martinez	110383	No										
26.0	T Roberts/Dugan Prod	111483	No										
27.0	R J Matuschek/USDHHD	110283	Yes										
28.0	Therese Patton	111083	No										
29.0	V M Bathurst/USSCS	111083	No										
30.0	Walton Hawk	110783	No										
31.0	BIA/Navajo Area Dir	111083	Yes			X					X		
32.0	Nat'l Parks & Cons	111483	Yes				X						
33.0	Roland A. Goodman	111483	Yes										
34.0	USFWS	111483	Yes							X			X
35.0	Judy Stolz	111783	No										
36.0	DNA/Paul Fyfe	111883	Yes										
37.0	Sierra Club	111883	No										
38.0	DHHS/Frank Lisella	111683	No										
39.0	Thomas Seamster	111883	No										
40.0	NM Arch Council	111783	Yes									X	
41.0	Kit Carson Mem Foun	111783	Yes									X	
42.0	Star Lake Railroad	110983	Yes										
43.0	Taos Env Assoc	111783	Yes										
44.0	Hoy Barrett	111683	Yes										
45.0	A & C Keskulla	111783	No										
46.0	Sunbelt Mining Co	111883	Yes			X						X	
47.0	Teresa Seamster	111883	No										
48.0	DNA/John Sleda	111883	Yes				X			X			
49.0	USEPA/D Whittington	111583	No										
50.0	Taos Env Assoc	111683	Yes				X						
51.0	Env Defense Fund	111683	Yes						X				
52.0	Nat Res Defense Coun	111883	Yes			X				X			
53.0	Fred York	111883	Yes										
54.0	Santa Fe Coal Corp	112183	Yes										X
55.0	USFS/James Overbay	111683	No										
56.0	Alb Wildlife Fed	112183	No										
57.0	Navajo Nation	111683	Yes			X				X		X	X
58.0	State of New Mexico	112383	Yes				X					X	
59.0	SWRIC	112183	Yes									X	X
60.0	NPS	112283	Yes										
61.0	Sydney Johnson	110883	No										
62.0	Adv Coun Hist Pres	111583	No										
63.0	Black Diamond	112183	Yes										
64.0	OSM	112583	Yes				X					X	X
65.0	Vernon Moore	112583	No										
66.0	Arch Minerals	120183	No										
67.0	NOAA	112183	Yes										
68.0	Depart of Air Force	121583	No										

H=Hearing Transcripts

Water Quality/ Quantity	T&E Species	Air Quality	Geologic Setting & Hazards	Mineral Resources	Paleo	Cultural Resources	Visual Resources	Recre- ation	Wild- erness	Trans- portation	Social/ Eco- nomics	Social Navajo	Edit	Miscellaneous
X														
						X				X	X			Surface Owner
						X						X		Scoping
				X								X		Hearings
X				X		X						X		Unsuitability
X														
				X								X		Lawsuit
					X									
											X	X		Fair Market
		X									X	X		
												X		
X												X		Unsuitability
X						X				X				
						X		X			X	X		
						X					X	X		
						X				X		X		
														Hearings
				X	X		X	X			X	X	X	
		X		X	X					X	X	X		
				X										Comments
X				X		X		X		X	X			
X				X		X				X		X		
X		X		X		X			X	X	X	X		Unsuitability
X		X		X	X	X		X	X	X	X	X	X	Unsuitability
		X												
X		X		X		X				X	X	X		
		X												

Comments from individuals and special interest groups represented a continuum from pro - to anti-mining (development) position. Most comments expressed a deep concern for the need of large scale coal leasing and development, socio-economic impacts on American Indians, reclamation, and water issues.

This summary by no means covers the content of all comments received but provides a broad overview. There was a total of 68 inputs i.e. letter, petitions, hearings, etc. received on the contents of the Second DEIS. Substantive comments are responded to in the following section.

COMMENTS AND RESPONSES

The following section contains substantive excerpts from oral testimony given at the public hearing, written exhibits presented at those meetings, and all the letters and cards received on the Second Draft EIS. BLM's response to comments follows each letter or individual excerpt. Hearing excerpts are denoted by the heading "Transcript".

Table 4-5 lists all of the individuals or groups, numerically, who submitted inputs on the Second DEIS. An individual assigned number can be cross-referenced with the list of specific comment or similar comments to see BLMs response to their particular concern.

All substantiative comments were considered and responses are made to comments that present new data, question facts or analyses, or raise issues bearing directly upon the enviromental effects of the proposed actions or the alternatives to the proposed action. In some cases these responses entailed revisions in the Second DEIS text. Similar comments were grouped where possible, and one summarizing comment was developed. If the commentor did not make substantive comments, no response was given. We appreciate everyones views and input.

NAVAJO RELOCATION

The public has expressed great concern over the Navajo relocation issue. The following discussion will provide more detailed information, and explanation of the relocation issue. The discussion is in two parts: the first concerns competitive tracts and the second concerns PRLA tracts.

COMPETITIVE TRACTS

There are three situations with respect to occupants on competitive tracts: (1) Unauthorized occupants which have no permission or authorization to live on public lands (lands under BLM administrative jurisdiction). (2) Authorized occupants which are on Tribal, Indian trust, Indian allotment, and private lands, but are not qualified surface owners as defined below. (3) Qualified surface owners; these are defined as:

The natural person or persons otherwise meeting the requirements of this section or corporation, the majority stock of which is held by a person or persons otherwise meeting the requirements of this section. who:

- (1) Hold legal or equitable title to the surface of split estate lands;
- (2) Have their principal place of residence on the land, or personally conduct farming or ranching operations upon a farm or ranch unit to be affected by surface mining operations; or receive directly a significant portion of their income, if any, from such farming and ranching operations; and
- (3) Have met the conditions of paragraphs (1) and (2) of this subsection for a period of at least 3 years, except for persons who gave written consent less than 3 years after they met the requirements of both paragraphs (1) and (2) of this section. In computing the 3-year period the authorized officer shall include periods during which title was owned by a relative of such person by blood or marriage if, during such periods, the relative would have met the requirements of this subsection.

The unauthorized occupants are the only residents that would be required to relocate involuntarily. A summary of the unauthorized occupants is given in Table 4-6.

Under the worst-case analysis 12 residences would be required to relocate. The residences over Gallo Wash 2 and Nageezi are on underground tracts and, therefore, relocation would probably not be necessary. A more realistic analysis would be to assume the tracts likely to be leased would be in the Minimum Surface Owner Alternative or the Target Alternative. The High Alternative tracts were determined to be less desirable for leasing. This leaves two tracts with six residences that would probably be required to relocate and three of those residences are located on or near lands included in the proposed Navajo Exchange. If these areas are transferred to Tribal

TABLE 4-6

UNAUTHORIZED RESIDENCES ON COMPETITIVE TRACTS

Tract	Type of Mine	Alternative	Number of Residences
Gallo Wash 2	Underground	Minimum Surface Conflict	6 ^{b/}
Nageezi	Underground	Minimum Surface Owner Conflict	1
Star Lake East	Surface	Target	5 ^{b/}
Bisti 2	Surface	Target	^{a/}
Crownpoint NE	Surface	High	3 ^{b/}
Johnson Trading Post	Surface	Target	1 ^{b/}
Bread Springs 1	Surface	High	3
Total			19

^{a/} Two buildings belonging to the United Methodist Mission.

^{b/} Located on or near the boundary of lands included in the proposed Navajo Exchange. For Star Lake East only two of the five residences are associated with the Navajo Exchange.

ownership, they would become unsuitable for mining unless the occupant agrees in writing to be relocated. This analysis is more realistic as to the number of residences which would be required to relocate.

Mining is not permitted within 30 feet of the residences of authorized occupants unless the leasee obtains written approval; therefore, 8 1/4 acres of surface per residence would be unsuitable for mining. The acreage could vary because of required side slopes, from 8 1/4 acres on areas with 20 feet of overburden to approximately 19 1/2 acres on areas with 220 feet of overburden. If residences are clustered together, area between the residences would also be unsuitable because the space involved would be too small to mine.

Written consent from qualified surface owners must be obtained before the tract can be offered for sale. Written consent is defined as:

A document or documents that a qualified surface owner has signed that: (1) Permit a coal operator to enter and commence surface mining of coal; (2) Describe any financial or other consideration given or promised in return for the permission, including in-kind considerations; (3) Describe any consideration given in terms of type or method of operation or reclamation for the area; (4) Contain any supplemental or related contracts between the surface owner and any other person who is a party to the permission; and (5) Contain a full and accurate description of the area covered by the permission.

PREFERENCE RIGHT LEASE APPLICATIONS

There are two situations with respect to occupants on PRLA tracts. The first is regarding unauthorized occupants. While the second is regarding authorized occupants who reside on Tribal, Indian trust, Indian allotment or private lands. The unauthorized occupants will be required to relocate if the area is necessary for mining. Table 4-7 summarizes the authorized and unauthorized occupants on PRLAs.

Eighteen unauthorized residences would be required to be relocated. Mining within 300 feet of the authorized residences would not be permitted unless the lessee obtains written approval from the resident. Surface owner consent does not apply to PRLAs (43 CFR 3427.0-7).

The residences on the PRLAs and competitive tracts were identified by both helicopter and ground field surveys. Each residence was visited twice by Navajo speaking individuals and many residents were contacted individually by BLM, BIA and Tribal Officials. Many individuals have indicated there are more occupants than BLM has accounted for. The BLM to date has been unable to locate any additional residents on the PRLA or competitive tracts. If additional residents have been located or have not been contacted, detailed information should be provided to the BLM. The BLM is committed to provide an accurate analysis, and inform all residents located on coal tracts of their rights.

TABLE 4-7

AUTHORIZED AND UNAUTHORIZED RESIDENTS ON THE PRLAS

PRLA Number	Type of Mine	Unauthorized Residences	Authorized Residences
NM-585	Surface	2	5
NM-8717	Surface		3
NM-8715	Surface		2
NM-8130	Surface	4	8
NM-8128	Surface	1	13
NM-3918	Surface	11	
NM-6801	Underground		6
Total		18	37

COMMENTS AND RESPONSES

Comment letter, hearing transcript excerpts, and responses are presented in the following section. Excerpts from the hearing transcripts are denoted by the commentor number, capital H, and the name of the commentor. The excerpts are numbered from 3H-24H.

Charles W. Luscher
October 12, 1983
PAGE 2

1



RICHARD BOWMAN
CHAIRMAN

GLORIA HOWES
1ST VICE-CHAIRMAN

RUSSELL KING
2ND VICE-CHAIRMAN

DONALD L. JORDAN
COUNTY MANAGER

PHONE (505) 722-3669
P. O. BOX 70
GALLUP, NEW MEXICO 87301

County of McKinley Board of Commissioners

October 12, 1983

Charles W. Luscher
State Director
Bureau of Land Management
Caller Service 4104
Farmington, New Mexico 87401

RE: Comments on Second Draft,
San Juan River Regional
Coal Environmental Impact Statement

Dear Mr. Luscher:

I have had an opportunity to review your second draft, and would offer the following comments:

The second draft, page 2-24, states under Surface Water Use: "Legal constraints are placed on the use of surface water in the region. Surface water is under the jurisdiction of the New Mexico State Engineer. At present, all surface water is fully appropriated." At page 2-25, under Ground Water, no such statement is made, which could lead to the incorrect inference that groundwater use is not legislatively controlled in this state; in fact, groundwater use is subject to the doctrine of prior appropriation under a regime very similar to that regulating surface water.

If the Environmental Impact Statement was drafted in relevant portion based upon this omission, insufficient consideration may have been given to the impact of higher demand on groundwater resources precipitated by increased residential and related demands, and those needs generated by the inevitable appearance of support and collateral industries on prior appropriators, and the loss of alternative water resources available to municipalities, particularly Gallup, New Mexico, already faced with a critical water supply situation.

1.1

1.2 In conjunction with the above, the doctrines of implied federal reservation of water rights, trust responsibility to the tribes concerning water and aboriginal groundwater claims must be addressed.

Groundwater is so critical to projected growth that I feel that any effect thereon, however minimal, must be more fully addressed in your Environmental Impact Statement.

Sincerely,

Forrest G. Buffington
Forrest G. Buffington
County Attorney

FCB/ka

Donald L. Jordan
Approved by Don Jordan

Responses to comment letter #1.

1.1 A discussion of the State Engineer's role in allocating ground water appears on page 2-30.

1.2 Federal reserved water rights and aboriginal claims made by the Indian tribes are still in court and in a state of flux, with amounts of water not yet generally quantified.

Legal questions or conflicts pertaining to who has the jurisdiction to appropriate ground water under Indian reservations are beyond the scope of this document, and are not included in this EIS. Until this question is resolved, we are required to follow existing laws and procedures. The legal constraints in the use of ground water for the State of New Mexico are listed in Appendix A-5. Direct impacts to all ground water resources from coal mining would be mitigated according to the requirements specified in the New Mexico Surface Mining Act of 1979. Indirect impacts are mitigated by the requirement of the lessee to submit a Plan of Replacement to the State Engineer.

2

(Typed for Reproduction Purposes)

State Director, ELM

Comments on San Juan River Regional Coal Leasing EIS.

Please cancel all leasing of coal in the region. It is not needed as we have enough coal leases for the next 100 years. Also the present price is too low. The environment is more valuable than the coal.

/s/James V. Lewis
3401 Mars Rd. NE
Albuquerque, NM 87107



United States
Department of
Agriculture

Soil
Conservation
Service

517 Cold Avenue SW, Rm 3301
Albuquerque, NM 87102

October 20, 1983

Mr. Charles W. Luscher
State Director
Bureau of Land Management
P.O. Box 1449
Santa Fe, NM 87501

Dear Bill:

We have received the second draft of the San Juan River Regional Coal Environmental Impact Statement, dated September 12, 1983.

The comments made by this office on the November 1982 draft are still applicable. We have no further comments.

Thank you for the opportunity to review this draft environmental impact statement.

Sincerely,

C. B. Blackburn, acting

Ray T. Margo, Jr.
State Conservationist

No substantive comments in letter #2.

No substantive comments in letter #3.

4H

Transcripts

Bert Mescal

COMMENTS

- 4.1 I'd like to ask the BLM people right now if they have a place for us where we can move our homes and livestock to. I'd like to hear from them this morning before I leave.
- 4.2 They should at least give us sovereignty tax that the state will collect, the government will collect.

Responses to hearing comment #4.

- 4.1 The BLM has no information on the timetable or precisely how many Navajo occupants will be relocated. If only a small number of tracts are leased with minimal surface owner conflicts, there may be very few or no relocation problems. Without this detailed information the BLM cannot predict the relocation details. These details will be determined during mine plan review. The total number of residents (in a worst-case analysis) which would be required to relocate under this stipulation is 12 for competitive tracts and 18 for rHAs. The BLM does believe that very few unauthorized occupants will be relocated, and these residents can be relocated with adequate forage and water for their livestock and preferably within their chapter boundaries.
- It should be noted that the stipulation requiring relocation is for unauthorized occupants only. These residents are located on public lands without permission or authorization. All other occupants have surface owner consent or their residences are unsuitable for mining within 300 feet unless the lessee receives written permission from the owner allowing surface coal mining. Refer to the Navajo Relocation section in the beginning of Chapter 4 for a more detailed response.

- 4.2 It is assumed that the tax referred to is the severance tax. This tax is imposed and collected by the State and its distribution is controlled by the State and, therefore, is outside BLM jurisdiction.

5H

Transcripts

Ike Halliday

COMMENTS

- 5.1 The different regulations and the different information in this work-up here, in this EIS is very confusing to me about whether the owners of surface owners or surface residents have to be or can be forced to relocate or whether they have the option of preventing that if they so desire.
- In speaking to one of the BLM representatives, he informed me that no mining can take place unless the consent to it, but other things that I read in the material indicate otherwise. So I think that needs to be cleared up and explained to people.
- 5.2 According to the information in the leases or some of the government regulations or somewhere....it says that the cost of relocating road and right-of-ways will be negotiated with the appropriate government entities. Well, this doesn't tell us a whole lot.
- I think if we're going to relocate a road, I think it should be specified, and the coal company should bear the expense of relocating the road.
- 5.3 I have another concern about the cultural and paleontological resources and the lease agreements supposedly will pay for an inventory and see that certain ones are dedicated and curated and so forth, but there is no provision for paying these curation costs.
- As I understand it, that's left up to the government. Most of the museums around the country are just struggling to handle what they do have, and if they have the added burden of curating all of these different resources that are mitigated, they have no place to put them and no money to provide for them, so therefore I propose that in the lease agreement there be some kind of fee per ton appropriated for curation facilities.

Responses to hearing comment #5.

5.1 If individuals living on competitive tracts in the area are determined to be "qualified surface owners" under the Surface and Mining Control and Reclamation Act, their consent is required before mining can take place on their lands. Consent to mining is not required from those residents who do not qualify as "surface owners" under this Act. However in accordance with SMRA mining is not allowed within 500 feet of an occupied, authorized dwelling unless this resident agrees in writing.

"Qualified Surface Owner" as published in the Federal coal management regulations means "the natural person or persons who: (1) Hold legal title or equitable title to the surface of the split estate lands; (2) Have their principal place of residence on the land, or personally conduct farming or ranching operations upon a farm or ranch unit to be affected by surface mining; or receive a significant portion of their income, if any, from such farming or ranching operations; and (3) Have met the conditions of paragraphs (1) and (2) above for a period of at least 3 years. Also refer to the Navajo relocation section at the beginning of Chapter 4.

5.2 Rights-of-way on public land will be relocated when needed to allow coal mining operations. For those right-of-way grants which contain terms or conditions allowing the right-of-way to be modified, the right-of-way grantee shall pay all reasonable costs of relocation. For other right-of-way grants, the coal lessee will pay all reasonable costs associated with the relocation. These conditions will be attached as special stipulations in the coal lease form as outlined on page I-5.

Negotiations, or lease term requirements, between the appropriate individual or governmental agency, would be required before rights-of-way on private, State, or Indian lands would be relocated.

5.3 The curation of cultural materials or non-cultural materials collected from cultural sites is handled through the Antiquity Permit and mitigation plan processes. Each person, organization or institution who holds an Antiquity Permit to conduct cultural investigations on Federal land must have an agreement with a repository to curate collected materials. This repository must be approved by the Federal agency granting the permit. The BIM and OSM will review and approve all mitigation plans for extraction of information from the cultural sites within the coal lease tracts. The mitigation plan will state where the collected materials will be curated and who will pay for the curation. The mitigation plan will only be approved if the curation will be paid for by the coal company. For paleontological resources refer to the Alternative Mitigating Measures on page 3-86.

The New Mexico Bureau of Mines and Mineral Resources has developed a fairly comprehensive and coherent document for paleontological mitigation procedures. With input from other concerned state institutions this plan may become the basic document for mitigation procedures accepted by all agencies concerned for the entire State of New Mexico. BIM is presently endeavoring to conclude such an agreement.

6H

Transcripts

Hank Poelman

No substantive comments

7H

Transcripts

Judy Stolz

No substantive comments

Transcripts

Paul Fyfe/DNA

COMMENTS

8.1 First of all, the EIS claims to comply with the National Environmental Protection Act, and the Supreme Court case of *Kleppe v. Sierra Club* by analyzing the cumulative and synergistic impacts of development in the San Juan Basin. That statement, however, is belied by the content of the EIS. On page 3-2 the EIS makes the assumption that the impacts of haul roads, utility easements and other associated facilities will not be analyzed until permits are applied for.

8.2 On page 3-3, the Environmental Impact Statement assumes that leasing or production from one tract or cluster of tracts would have no effect on impacts from another tract. The EIS states that impacts from development on one tract will not exacerbate the impacts from another tract.

That is exactly what the EIS is supposed to study, whether impacts from one tract will or will not exacerbate impacts from others. That is the meaning of the words "cumulative and synergistic impacts". This question cannot be dismissed with an assumption. The final EIS must really study it.

8.3 Neither cumulative overview nor this EIS adequately addresses interrelationships of other projects in the area. For example, nowhere is there a predictive study showing how much more coal will be mined if NMGA is built. These kinds of interrelationships must be studied in order to satisfy NEPA.

8.4 Another major deficiency in the EIS is its so-called analysis of the need for leasing. In order to make a meaningful choice between alternatives, the EIS must have information before it about the need for more coal leasing in this area. Instead of presenting that information this EIS merely states that the need for the action has been established by the Department of Energy.

The need for the action is based on Department of Energy production goals. What the EIS fails to say is that the Department of Energy production goals are woefully out-of-date. They are based on four year old information. The EIS is ignoring new studies, such as the New Mexico Energy Research and Development Institute study which show the need for coal from this area is much lower than the Department of Energy has estimated.

The EIS must disclose the information upon which it is going to base its decision and that information must be the most accurate possible. A conclusory (sic) statement that the need for this leasing has been established is not adequate disclosure.

8.5 On page 2-1, the EIS states that the average precipitation in the EIS area is between 10-14 inches.

However, on page 4-54, the EIS lists precipitation levels for the year 1979-80 at eight test sites. The results of those, the results obtained

8.5 at those test sites are as follows: 7.86 inches; 7.15 inches; 6.74 inches; 9.53 inches; 6.91 inches; 11 inches; 9.25 inches; and, 11.08 inches.

It's hard to see how the EIM — the EIS can say that precipitation in this area averages between 10-14 inches when only two of the eight samples cited above show levels about 10 inches per year, and four of the samples are at least 3 inches below 10 inches per year.

When considering reclamation prospects, the difference between 6.74 inches and 10-14 inches a year is huge. The final EIS should reflect the sample data.

Responses to hearing comment #8.

8.1 Impact analysis for proposed mining facilities such as haul roads, utility easements, and other associated facilities cannot be conducted until tract-specific plans providing detailed information on the type and location of facilities are prepared. However, these impacts are considered generally on a regional basis. This information is not available until after leases have been issued and the lessee has applied for the necessary permits. Therefore, the assumption that further environmental analysis will be conducted at the mine plan stage; i.e., permitting stage is correct.

The existing activities are considered as part of the existing background. This EIS only discusses the impact of potential mines. The impacts of other proposals; eg., New Mexico Generating Station and Wilderness Study Areas, are discussed in other EISs prepared for those activities.

The scope of the San Juan River Coal EIS was limited to analyzing the impacts of leasing and developing Federal coal. Other actions proposed in the San Juan Basin (WSAs and NMGS) are distinct, separate, and independent actions. Even though specific projects are proposed in and adjacent to the Zisti area, approval and implementation of any action would not trigger approval (or disapproval) and development of other actions. Additionally, approval and development of any one action is not required before other actions could be developed, if approved. The timing required to implement these actions differs according to the project because of the following variables 1) congressional designation, development and implementation of management plans for wilderness areas; 2) Acquisition of permits, negotiation of contracts, and construction of NMGS; and 3) acquisition of permits, negotiation of contracts and development of coal leases. (40 CFR 1508.25 (a)(1-3)).

Transcripts

Donna Syder

COMMENTS

The end uses to be made of coal produced in any specific tract or area, in the San Juan Basin, are not analyzed due to the unleased status and, therefore, uncommitted coal resources to projects in and out of the State. As far as the coal resources to be utilized in operating NMGS, it is assumed that coal would be available and contracts negotiated between PMW and coal companies in and out of the State, a point considered in the NMGS EIS. Specific projects that would utilize San Juan coal would be considered and analyzed when processing permits and when governmental approval (Federal and State) for such facilities has been granted.

- 8.2 This assumption is concerned that due to the distant location of some tract(s) there would be no effect on other tracts. The example given is that impacts associated with developing the four La Placa tracts north of Farmington would neither affect nor add to the impacts of developing tracts south of Gallup. For the most part, mining would occur in a limited portion of a tract. The time period in which production would begin would depend on a number of factors considered by the lessee(s). Therefore, only in those instances when actual mining operations for two or more mines are in close proximity to each other would there be any need to consider cumulative impacts. However, a cumulative and synergistic analysis was completed for each alternative. The text has been revised.

- 8.3 See the response to comment 8.1.

- 8.4 The need for additional Federal coal leasing was established and documented in the Final Environmental Statement: Federal Coal Management Program (USDI, BLM 1979) and confirmed and quantified by establishment of a leasing target based on the DOE production goals and consultation with State and Federal agencies. Comments questioning the need for leasing are based on claims that the production baseline applied to the DOE production goals was too small and improperly applied to the establishment of a leasing target. These issues were discussed in public meetings in Albuquerque and Farmington on February 23 and 24, 1982. This EIS analyzes the environmental impacts of coal leasing. Comments on DOE figures and leasing needs are considered beyond the scope of this EIS. After the EIS is published, the question of the proper leasing level will again be considered both by the Regional Coal Team and the Secretary of the Interior. The final analysis will be based on the latest available information on the factors listed in 43 CFR 3420.2(c), and the environmental concerns in this document (see also comment 58.15 and pages 1-1 and 1-3 of this document).

- 8.5 Average annual precipitation values are based on long-term data from a period of record of 25 years. The text is revised to read "The annual precipitation varies between 8 and 14 inches."

- 9.1 On page 4-132, in the EIM response to comment 15.1, the EIM disclaims clear authority to specify or require Navajo preference in its leases. This is inconsistent with the comments. On page 1-6, the EIS states that "Department of the Interior has full discretion to include lease terms required to protect the public interests..."

Elsewhere in the EIS, EIM claims Navajos suffer 75 percent unemployment. The tension between these three statements should be apparent. Given astronomical rates of unemployment among Navajos, Navajo preference certainly meets the qualifications of a standard so vague as necessary to protect the public interest.

Further, if the Secretary of the Interior has full discretion to include lease terms that further the public interests, then BLM's authority to require Navajo preference is undisputed.

- 9.2 The EIS bases its assessment of the densities of archaeological sites on a computerized predictive model developed in 1981. The model assumes that sites are dispersed evenly throughout the tracts proposed for mining. To base the assessment of archaeological impact on a computer model utilizing such assumptions offends common sense and experience.

Additionally, using the predictive model violates the intent and purposes of the National Historic Preservation Act. 100 percent surveys before leasing are necessary to protect such valuable and irreplaceable resources. Surveys performed by mining companies after they have their leases in their hands are bound to be suspect.

- 9.3 On page 1-35, the EIM states that American Indian sites should be identified before they are destroyed by mining facility construction. On page 4-135 the EIM claims that sacred sites are not afforded protection by the American Indian Religious Freedom Act. I would direct your attention to the words of the Act, codified in 42 U.S.C. section 1996 (1980 supplement) are clear:

"... it shall be the policy of the United States to protect and preserve for American Indians their inherent right of freedom to believe, express, and exercise the traditional religions ... including but not limited to access to sites."

Should the plain meaning of the words of the Act evade the BLM, I direct your attention to the District of Columbia Circuit Court's 1983 opinion. That opinion is in Wilson, et. al. v. Block, commonly known as the "San Francisco Peaks" case. In that decision, handed down in May 1983, the U.S. Court of Appeals declared that AIRFA at a minimum, requires government agencies to avoid unnecessary interference with Indian religious practices and to refrain from prohibiting access to sacred sites.

Allowing sacred sites to be destroyed certainly precludes access to those sites, I would say. There can be no doubt that all such destruction violates the plain meaning of the Act as well as the case law interpreting the Act. The BLM can not continue to dismiss the protections of AIRFA in one short sentence without even the most rudimentary examination of the true significance of the law.

9H

Transcripts

DNA-PEOPLE'S LEGAL SERVICES, INC.

PETERSON ZAH
DIRECTOR
POST OFFICE BOX 116
CROWNPOINT, NEW MEXICO 87113
TELEPHONE (505) 766-5277

NORMAN RATION
DEPUTY DIRECTOR

November 21, 1983

Charles W. Luscher
State Director
Bureau of Land Management
Caller Service 4104
Farmington, New Mexico 87401

CERTIFIED MAIL

RE: Comments on Second Draft: San Juan River Regional Coal
Environmental Impact Statement

Dear Mr. Luscher:

Please review the following comments on the above referenced documents:

(1) The Bureau of Land Management (BLM) appears to have intentionally attempted to reduce public participation in the coal-leasing decision-making process. A single hearing was held in Farmington despite numerous requests (including that of New Mexico State Governor Toney Anaya) that the BLM provide a realistic opportunity for public comment. Hearings should have been held in the local Navajo communities which will be most directly affected by the proposed development. The BLM should have also scheduled a hearing in a more central location such as Albuquerque to provide concerned citizens from other areas the chance to be heard. Apparently the BLM chose Farmington as the site least likely to attract attendance because of its inconvenient location. Consequently the furtherance of public interest, the duty of the BLM, demands a second series of public hearings.

(2) It is untrue that the BLM is required to issue a lease to a Preference Right Lease Application (PRLA) holder if the holder has discovered coal in commercial quantities. Comments to the original Draft Environmental Impact Statement (DEIS) and at prior Regional Coal Team meetings have raised the issue of unlawful issuance of prospecting permits to PRLA holders or their precursors. The BLM is obligated to investigate these allegations to ensure that all procedural and substantive requirements were met.

Furthermore, although the BLM obliquely alluded to its right to consider the costs of lease term compliance (2nd DEIS, p. 1-6), the BLM should admit that it has the authority and duty to put environmental and other stipulations on Preference Right leases that would limit the coal leased in some areas and eliminate it all together in others. 30 U.S.C. §§187, 189, 207(a) (1976); 43 U.S.C. §1732 (1976); 30 U.S.C. §21(a) (1976); 30 U.S.C. §1201 et seq. (Supp. II 1978); et alia.

Page Two .

(3) The BLM consistently attempts to cover the deficiencies of the 2nd DEIS by arguing that necessary studies, inventories, surveys, consents, etc. will be obtained at the mine plan stage. See, e.g., 2nd DEIS, p. 1-18. Studies performed by mining companies after they have their leases in hand should be highly suspect. According to at least one noted commentator, postponing mitigation requirements until the mine plan stage or relying on retroactive regulation is not only foolish, but may be subject to mining companies' claims of interference with vested rights. Pring, George W. "Conditioning Federal Resource Leases," Natural Resources Lawyer, Vol. XIV, No. 2, p. 307. Furthermore the Secretary of the Interior has determined that mitigation requirements should be decided "prior to the lease sale," not afterward. Coal Programmatic Final EIS, p. 6-4 (1979).

(4) The BLM bases its assessment of the densities of archaeological sites on a computerized predictive model developed in 1981. (2nd DEIS, 2-134). The model assumes the sites are dispersed evenly throughout the tracts proposed for mining. To base the assessment of archaeological impacts on a computer model utilizing such an obviously flawed assumption offends common sense and experience. Archaeological sites were created by communities of humans. The incidence of human residence is not uniform geographically.

Additionally, using the predictive model violates the intent and purposes of the National Historic Preservation Act, 16 U.S.C. §470. 100 percent surveys before leasing are necessary to protect such valuable and irreplaceable resources.

(5) The BLM disclaims "clear authority" to specify or require Navajo preference in hiring in the leases. 2nd DEIS, 4-132. This reticence conflicts with the statement on page 1-6 where the BLM states that the Department of Interior has full discretion to include lease terms required to protect the public interests... "(Emphasis supplied). The latter statement correctly states the law. The federal government's authority to include terms which condition mineral leases is squarely based on constitutional and statutory provisions, as well as judicial decisions and departmental practices. See, generally, Pring, George W. "Conditioning Federal Resource Leases," Natural Resources Lawyer, Vol. XIV, No. 2, pp. 309, et. seq..

The BLM claims that Navajos suffer unemployment at a rate in excess of 75 percent. 2nd DEIS, 2-58. The BLM also admits that many Navajos will not benefit financially from coal development and yet will suffer financially as a direct result of the coal development. 2nd DEIS, xvi. Given those facts, preferential Navajo hiring is imperative "to protect the public interest." Consequently, the BLM should admit that it has "full discretion" to include terms which specify or require Navajo preference in its leases.

(6) The BLM claims that sacred sites are not afforded protection by the American Indian Religious Freedom Act (AIRFA). 2nd DEIS, p. 4-135. The words of the Act, codified at 42 U.S.C. §1996 (Supp. IV 1980), are clear and unambiguous:

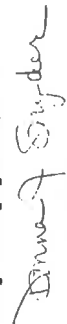
...It shall be the policy of the United States to protect and preserve for American Indians their inherent right of freedom to believe, express, and exercise the traditional religions... including but not limited to access to sites... (Emphasis supplied).

The United States Court of Appeals for the District of Columbia (in the May 20, 1983 opinion of Wilson, et al. v. Block) has declared that AIRFA, at a minimum, requires government agencies to avoid unnecessary interference with Indian religious practices and to refrain from prohibiting access to sacred sites.

The BLM states that "American Indian sites should be identified before they are destroyed by mine facility construction." 2nd DEIS, p. 1-35. Allowing sacred sites to be destroyed certainly precludes access to those sites. There should be no doubt that such destruction violates the plain meaning of the Act as well as to the case law interpreting the Act. The BLM can not continue to dismiss the protections of AIRFA without even the most rudimentary examination of the true significance of the law.

In conclusion I offer you these comments and commend them to you for appropriate action thereon. Thank you for your attention.

Very truly yours,


Donna J. Snyder
Attorney

DJS/ce

Responses to hearing comment #9.

9.1 Concerning Navajo hiring preference, it is stated in the response on page 4-152 of the Second DEIS that beneficial economic impacts would occur to Navajos who have or can obtain the necessary job skills. However, the number of Navajos possessing these skills is not available to us and, therefore, not documented in the DEIS. The BLM has the authority, we believe, to require American Indian hiring preference. This authority has not been judicially tested, but it is reasonably derived from both the constitutionality of Indian hiring preferences and the Secretary's authority to insert terms and stipulations in leases that he determines are advisable to "protect the interests of the United States,... and for the safeguarding of the public welfare (30 U.S.C. § 187).

A mitigating measure requiring Navajo Preference has been drafted and is discussed in the section on Alternative Mitigation Measures.

9.2 The predicted number of sites in each tract was determined using all available data from cultural resources surveys conducted on or near the tract and Kemmer's (1981) predictive model for areas between Bisti and Star Lake. Table 2-9 summarized the percent of inventory on each tract and the number of sites located. Using these sources it was assumed, knowing that this is not reality but may be realistic over a wide area, that sites are distributed evenly. Therefore, if known site densities ranged from eight to twelve sites per section in adjacent areas that had been surveyed, these figures were then extrapolated to the coal tract. Only through intensive inventory will the actual number of sites within the tract be known. It is premature and uneconomical to require 100 percent survey before a decision is made on which tracts are to be offered for sale.

9.3 Although BLM plans to take appropriate measures to assure that sacred sites be identified and that the Navajo Nation be provided the opportunity to conduct appropriate mitigating measures for these sites, we do not believe the American Indian Religious Freedom Act (AIRFA) intended to prevent large-scale, resource development, but rather to assure that religious and sacred sites are identified and appropriate mitigation measures considered.

In the opinion of Wilson, et. al. vs. Block, the court declared that the AIRFA, at a minimum, requires government agencies to avoid "unnecessary" interference with Indian religious practices.... (Emphasis added).

Every effort will be made to identify sites in planned development areas and to mitigate, as far as practical, adverse impacts to these sites. The stipulations listed in Appendix I-2 (more particularly the stipulation on page I-8, paragraph 4) will become applicable to all competitive & PMLA coal leases.

9.4 A hearing was held on the Second Draft San Juan River Regional Coal Environmental Impact Statement on November 8, 1983 at Farmington, New Mexico in both a morning and evening session. The hearing was held during the 45-day public comment period at a location central to the area of impact. Those people unable to attend the hearing could submit comments in writing. Because much of the material in the Second Draft (October 1983) was also presented in the first Draft (November 1982), a long, extended comment period was not needed. Over the past several

9.9
(cont)

Transcripts

Allison Monroe/SWRIC

COMMENTS

9.4 years and through the planning and EIS processes BLM has met with many Navajo individuals at their homes, in the field and in Chapter Houses to discuss the proposals and to receive their comments (see discussion in Chapter 4). Throughout both processes BLM has and continues to honor all requests from the Navajo people to meet with them, discuss their views and receive their input.

9.5 The issue of unlawful issuance of prospecting permits to PRLA holders or their precursors is concerned with procedural aspects of BLM's permitting process. Therefore, this concern is not delineated as a comment requiring a response or text change, but rather a point for internal review by Bureau staff.

9.6 The statement was made in paragraph 2, page 1-6, of the Second Draft EIS that lease terms are required to protect the public interest. It is further stated that "If after consideration of all expected costs including the cost of lease term compliance, the Department concludes that the PRLA holder has discovered coal in commercial quantities, a lease must be issued to the PRLA holder." It can automatically be determined that if the expected costs (particularly the cost of implementing mitigation measures and stipulations) exceed the cost of coal development and recovery, the preference right lease would not contain commercial quantities of coal and would, therefore, preclude the issuance of that particular lease(s). We feel the text does not need to be revised.

9.7 See the Response to 9.2.

9.8 The statement on page 1-6 under the heading of Preference Right Lease Issuance reads "The Department of the Interior has full discretion to include in leases issued to PRLA holders, lease terms which are required to protect the public interest." See the response to comment 9.1.

9.9 See the response to comment 9.3.

10.1 Now, I hope that BLM does not represent in Washington or elsewhere that this second draft answers people's concerns. It does not. I think, if I have to choose that the first draft does not assess the need for the coal, and that the concerns for the people that live in and use their areas are not being addressed, and second draft does not help in these respects.

10.2 the calculations showing the need for competitive leasing were fudged. They were not sincere. The BLM ignored its own best information on what the supply and demand of coal was going to be, and arbitrarily chose to hold a competitive lease sale.

10.3 I commend BLM on showing some alternative lease stipulations and having a sub-alternative that alleges to consider alternative lease terms, these lease terms do not deal with the problems, the most important problems of the people living out there

As Mr. Mescoal said, the BLM has not said where people are going to go. It has not said that people are going to be paid. It has not taken any measure to show that people who live out there are going to benefit from this big development, and this could have been done. If BLM would admit that it can put strong stipulations on a PRLA, stipulations that protect the public interest, that would be such an improvement.

For example, if BLM put a stipulation on the PRLAs, saying that coal under anybody's dwelling would not be leased except at the request of the occupant, this would resolve a lot of the problems.

Responses to hearing comment #10.

10.1

The EIS is concerned with identifying and analyzing the impacts that would result from the issuance and development of leases for Federal coal. The concerns of the public, special interest groups, and industry are considered and incorporated, as appropriate, in the EIS in the form of text changes or responses to comments. Concerns, as expressed in the hearing transcript and letters are printed in the cumulative overview final and the final San Juan River Regional Coal EIS. These are available for review by the Secretary of the Interior. See the response to comment 8.4 for the need for leasing.

10.2 See the response to comment 8.4 on the need for leasing.

10.3

Refer to the discussion of relocation at the beginning of Chapter 4. The authorized occupants and qualified surface owners may negotiate terms and conditions (which include monetary considerations) with the coal lessees if they wish to relocate. Refer to the responses to comments 21.3 and 48.16.

Transcripts

Submitted to State Director, Bureau of Land Management, Gallup Service 4104, Farmington, N.M. 87499, Nov. 17, 1983

COMMENTS ON SAN JUAN RIVER REGIONAL COAL ENVIRONMENTAL IMPACT STATEMENT,
SECOND DRAFT, OCTOBER 1983

Submitted by Klara B. Kelley, Society of Independent Anthropologists (SIA)
Box 2635, Gallup, N.M., November 8, 1983. Endorsed by the Board of
Directors, Society of Independent Anthropologists, c/o Eileen Camilli,
Secretary, 3100 9th St., Albuquerque, N.M. 87107, Nov. 17, 1983.

These comments pertain to the spheres of socioeconomic impacts,
American Indian concerns, and cultural resources. In the socioeconomic
and American Indian spheres, especially, the second draft of the San Juan
Basin Regional Coal EIS has made only cosmetic changes from the first draft.
Most of the deficiencies of the first draft stand out just as glaringly
in the second draft. The deficiencies in the first draft came from research
that was inadequate to assess impacts of coal leasing. The deficiencies
remain because, except in the sphere of cultural resources, BLM was evidently
unwilling to undertake the necessary additional research. Despite source
citations provided by such commentators as the "New Mexico Archaeological Council.

11.1

Socioeconomic Impacts

Again, impacts on rural communities in the San Juan Basin and on
the city of Gallup are ignored. On p. 4-117, the second DEIS states,

"While impacts would occur in rural areas, they were not considered significant and were, therefore, not considered within the EIS. Gallup was considered in the impact analysis conducted for each alternative. Significant impacts were not identified." The BLM has the obligation to present the data that have led to these conclusions, which are hard to accept in the absence of evidence. The BLM also admits that its researchers did not find data relevant to assessing certain impacts on rural communities. In the paragraph before the one just quoted, the DEIS states, "Localized data on Navajo employment figures and skills are not available from Chapters or other sources in the region." What, then, is the basis for the BLM to say on communities for which it has no data whether economic impacts/will or will not be significant? Moreover, data

11.2

are available, as the New Mexico Archaeological Council statement on the first DEIS pointed out, in a study done by Brigham Young University in 1974 (Wistisen, Parson, and Larson 1975) on file with the Navajo Tribe's library in Window Rock, Arizona. The 1980 census should also have been consulted, as well as other publications on rural energy-impacted communities in the San Juan Basin (Rodgers 1982; U.S. Commission on Civil Rights 1982).

It is also hard to believe that impacts on Gallup, which has thirteen competitive leasing tracts within a twenty-mile radius, will not be significant. One likely significant impact would be on Gallup's water supply, the deficiency of which has already pitted the city against water users in the Bread Springs area, where one of the larger competitive leasing tracts is located.

American Indian Concerns

In the sphere of American Indian concerns, probably the most glaring defect of the first DEIS was its failure to confront the problem of relocation of Navajo families from the FRL's and competitive leasing tracts, as many commentators on the first draft pointed out.

The second draft, as do the deficiencies in the data on Navajo use of the area that form the basis of impact assessment.

The widespread opposition to any coal leasing expressed by Navajo inhabitants of the chapters where coal leasing is proposed indicates that many, probably most, relocations will be against the wishes of the relocatees. The second DEIS seems to be trying to obscure the involuntary nature of the relocations by repeated references to negotiations between the lessee (the coal company) and the individual Navajo landowner or user (pp. 4-129 and ff.). In the past, according to hearings before the U.S. Commission on Civil Rights in 1981 (U.S. Commission on Civil Rights 1982:79-115), the

11.3

BIA has tended not to involve Navajo landowners (that is, owners of Indian allotments) in negotiations, but has simply dispatched the company that wants the lease to get signatures on a lease that the BIA has negotiated on behalf of the owners. Many landowners have complained that they were not even adequately informed of the terms of the leases, let alone involved in negotiations. The BLM has a past record of advocating even less involvement of the Indian owner in leasing by claiming, in the Amcoal case a few years ago, that leasing of federal coal does not require the consent of surface owners (Gallup Independent June 26, 1979, p. 1; see also "Bluerisque Journal

Dec. 21, 1979, p. F-2; Gallup Independent Jan. 6, 1981, p. 1 and June 17,

1981, p. 1). The second DEIS should consider the impact of the existing leasing practices that is, the creation of a very stressful kind of involuntary relocation for many families, and should propose mitigating measures -- ironclad provisions in the special stipulations attached to the standard lease agreement (Appendix I) that involve the surface owner in negotiations with the assistance of qualified legal counsel if the owner wants it.

Several commentators on the first DEIS recommended that the BLM set a minimum address the problem of relocation by consulting other studies on Navajo relocation elsewhere. According to p. 4-136 of the second DEIS, "Discussions of prior relocations would be general in nature and are not expected to provide additional material on the types of impacts expected to occur as a result of coal development." This statement indicates that the BLM researchers did not actually look at previous studies of the impact of relocation. Otherwise they would have found that these studies are very specific, not "general in nature," and certainly do provide "additional material;" they include a book-length study of involuntary relocations from Black Mesa (Scudder 1982), extensive material on forced stock reduc-

tion, which is likely to accompany relocation (Wood, Vannetta, and Andrews 1982), and several other works (Hodgers 1982; Kelley 1982:183-184, 194-195; 226-229; Schoepfle and others 1979).

The second DEIS does not spell out the logistics of relocation any more clearly than the first draft did. On p. 4-129, the BLM admits,

Until leases are issued, mine plans submitted and approved, and permits issued for actual mine operations, we cannot accurately determine which specific family units or individuals will be required to relocate nor are we able to determine exactly where these individuals will be relocated. The relocation issue will need to be resolved with the individuals, the lessee, and possibly Navajo Chapter officials, the Navajo Tribe and BIA.

The DEIS further states (p. 4-129 and Appendix I) that the leases will require that, unless residents agree otherwise, the lessee must provide them with land within the same chapter area that will offer enough range and water for relocatees to maintain their livestock. If the BLM had done its homework, it would see that this stipulation may be unfeasible in many, maybe even most, instances. The DEIS should address the feasibility of this stipulation.

The BLM took a census of occupants, and seems to assume that it is accurate (p. 4-133); I will question that assumption in a minute, but acknowledge that the census offers a conservative estimate of the number of families that each tract leasing may affect. The DEIS also establishes alternative levels of coal production and leasing, and has ranked the competitive leasing tracts in terms of desirability of mining (pp. A-50 - A-58). Therefore, it should have been possible for the

BLM to at least estimate the number of families that might have to be relocated for each level of leasing. It should also be possible to determine how much extra range exists in each chapter area, since virtually all stockowners are supposed to hold permits. I believe that if

11.10

the BLM had made such an analysis, the lack of land for relocatees would be glaringly evident. The failure of the BLM to carry out such an analysis, when the data are available to do it, is a failure to realistically assess the major impact of coal leasing on local Navajos.

I realize that the lack of a place to relocate a significant proportion of residents of a coal tract is not among the criteria for the unsuitability of leasing, but take the position of the Eastern Navajo and Commission (Gallup Independent Sept. 11, 1962, p. 1) that it should be added to the list of unsuitability criteria.

11.11

In my comments on the first DEIS I asserted that occupants of the PRLAs, and probably also the competitive leasing tracts, were underenumerated.

As an example I cited PRLA NM-8128. The second DEIS asserts (p. 4-133) that all homesites on the tract are abandoned, but I strongly question

the accuracy of that statement. In my experience those homesites have been used seasonally by at least three and probably eight families. The BLM evidently never bothered to send researchers to field check the accuracy of census data that the commentators on the first DEIS questioned. The second DEIS also states (p. 4-133),

It is acknowledged that individuals who are not actually living within a PRLA or competitive coal lease tract boundary will be impacted by proposed coal development. These individuals are included in the population figures, if they reside within the San Juan Basin.

11.12

I wonder about the truth of this statement, particularly for areas where the census was taken by helicopter overflight. Moreover, not only are the users of PRLA 8128 undercounted, but Appendix F lists at least one tract (PRLA 8129) as having no users. This tract has been delineated in two parts separated by a strip where several families live. These families also range into PRLA 8129, but the PRLA is not among those listed with users. I offer these as examples of how the DEIS may deceive the

public about the true number of Navajo families that coal leasing will affect. Moreover, many tracts, both PRLAs and competitive leasing tracts, that are not listed in Appendix F with users and therefore by

implication have no inhabitants or users, include allotments. What an earth is the basis for the BLM to imply that people do not use their own allotments, or that an estimated seventy-five percent of the PRLA acreage is unused by Navajos?

Finally, the second DEIS minimizes the importance of the local impacts of specific PRLAs and competitive leasing tracts, even though these impacts, considered cumulatively or even alone, might be very significant. For example, in Appendix A-1, which summarizes the impacts of mining in each competitive lease tract, degradation of groundwater quality is mentioned in many tracts. The communities that use this water are of both Indians and non-Indians, not named, even though some tracts yield water for large communities /

For example, coal mining would degrade water in the Bread Springs tract, now used by the city of Gallup, and water in the Bread Springs tract, where the city of Gallup has tried to get water rights.

is hard to learn anything about a particular site, even with ethnohistorical research, if the site has not been preserved. Sites dating around 1900 or earlier were considered potentially eligible for the National Register, but the eligibility of sites that date between 1900 and World War II is not considered one way or the other. Second, only ^{one} criterion of eligibility for the National Register was used, the famous criterion D, that the site contains information important to our knowledge of history or prehistory. There are other criteria according to which a site may be eligible for the National Register, such as the site's association with a person important to local, regional, or national history.

Only ethnohistorical research can determine such associations for particular sites, yet no ethnohistorical research accompanied the archaeological surveys. Therefore the National Register eligibility of sites of the historic period, especially those dating between 1900 and World War II, has not been adequately evaluated.

Another possible inadequacy in the archaeological data base is embodied in the percentages of archaeological site components attributed to each cultural-historical period on p. A-82. I suggest that the proportion in the Anglo-Hispanic category is too low; archaeologists tend to assume that historic-period campsites in the San Juan Basin were left by Navajos (for example, Kemrer and others 1981), when many are likely to have been left by the Hispanic and Anglo shepherds or cowboys who overran the Basin in the late 19th and early 20th centuries (see Wilson 1979 for the basis of this assertion; Kemrer has evidently classified as "avajo" the Hispanic sheep camps that Wilson correctly identified). If sites recorded archaeologically in the coal leasing tracts are incorrectly identified, how can their National Register eligibility be evaluated accurately?

It would seem from Appendix A-10, which lists the criteria according to which a tract is judged unsuitable for mining, that spoiling the water supply of a large number of people is not such a criterion. One would think that such water pollution would be a sound reason for classifying a tract unsuitable and would be added to the list of unsuitability criteria.

Cultural Resources

In the sphere of cultural resources, the second DEIS is an improvement over the first. Nevertheless, the treatment of cultural resources still seems inadequate for a realistic assessment of the impact of coal leasing. For example, Appendix A-11 shows that partial inventories archaeological sites were taken on fewer than half of the coal leasing tracts (fifteen out of thirty-nine).

Moreover, evaluations of eligibility for the National Register of historic sites seem inadequate, especially evaluations of "avajo" and other sites of the historic period. On p. A-83 appear statements that post-World War II sites are considered ineligible for the National Register on the grounds that more could be learned about them through ethnohistorical research than through archaeological research. I did not know that the ethnohistorical method of gaining information on a site made it ineligible for the National Register. In any event, it

11.15

11.16

11.17

Another concern expressed in comments on the first DEIS was that there is no guarantee of class-III (total-area coverage) archaeological surveys on all PRLAs and coal leasing tracts. Granted, the second DEIS states (p. 4-91), "We interpret this section /Appendix I-1, Special Stipulations, Section 31/ as requiring 100% intensive inventory before mining," and also (p. 4-84),

To address this possibility /that some cultural resources will be of special significance to local Native American people/, the lessee will conduct an ethnographic survey specifically directed toward identification of properties which have special significance to local Native American people additional

The language of the standard lease form ("Appendix I-1) and/special stipulations (Appendix I-2), however do not specifically require one-hundred-percent inventory surveys, let alone ethnohistorical research. If the

BLM is really sincere about the Class-III archaeological surveys and ethnohistorical research, the special stipulations of the lease on each tract, both for PRLAs and competitive tracts, should/require each lessee to finance a Class-III archaeological survey and ethnohistorical research.

Finally, the second DEIS should assess the impact of the policy

that makes Office of Surface Mining (OSM) the lead agency in enforcing the treatments of archaeological sites required in the leases. In 1981, ex-Secretary of the Interior James Watt

closed five regional OSM offices which included technical assistance for mining and replaced them with only two technical centers. Policy decisions which once were made in the region were centralized in Washington. The eighteen field offices which housed inspectors and scientists were reduced to six nationwide. District offices were replaced by state offices with decreased enforcement authority (Environmental Action and others 1985).

This gutting of the enforcement capability of OSM poses a threat to the cultural resources of the San Juan Basin. By failing to assess OSM's enforcement capability, this second DEIS underrepresents the extent to which cultural resources in the San Juan Basin may be destroyed without mitigation.

11.19

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Responses to hearing comment #11.

11.1 Source citations submitted by New Mexico Archaeological Council were considered. Data available from a 1974 study were not considered to be current and at that time, income sources were not available from the published 1980 census. Information of this type (income sources and occupational skills) is not expected to be of use in the identification and analysis of significant economic impacts on a regional basis. Comments and responses on utilizing other source citations are presented below.

11.2 The social and economic impacts to the Gallup area were considered in the impact analysis conducted for each alternative. The 12 tracts near Gallup have low levels of annual production and, therefore, do not generate high (significant) levels of social and economic change. The data utilized in the impact analysis for Gallup is on file and available for review in the Albuquerque District Office and Farmington Resource Area Office.

11.3 We assume the reference is to page 4-119. This is a regional EIS and, therefore, does not focus on family incomes or local skills. BIM is meeting its responsibility to analyze the social and economic factors that will be impacted on a regional basis through coal leasing. The data referred to is not believed to bear upon the analysis of significant regional impacts and, therefore, has not been included even though some of it has recently been published by the Bureau of Census.

11.4 Water replacement plans, when needed, will be required by the New Mexico Mining and Minerals Division according to New Mexico Coal Regulations, Rule 80-1 and the Surface Mining Control and Reclamation Act. How affected water developments will be replaced cannot be determined until specific mining plans are available. Significant impacts to the Gallup water supply are not anticipated because the State Engineer will adjudicate water rights. The State Engineer would not allow the companies to acquire water rights unless the existing water users are protected and replacement is adequate. Refer to page 2-20 for more discussion of protection and replacement of existing water uses. Site-specific impacts on existing water users will be identified and analyzed at the mine plan stage of the leasing process by regulatory agencies. A general water adjudication of the San Juan River Basin in New Mexico is also proceeding at present (State of New Mexico ex rel. State Engineer v. United States of America et al. Civil No. 75-124, District Court of San Juan County, New Mexico), in which the water rights claims of the Jicarilla Apache, Navajo, Ute Mountain Ute Tribe and other non-Indian defendants will be decided. Resolution of the controversies over ownership of water rights in the San Juan River Basin, and of the water adjudication and declaratory judgment suits in particular, are outside of the scope of the EIS. These legal actions concerning ownership of the water rights in the San Juan Basin are presented to acquaint the reader with potential conflicts with use of water for coal development.

11.5 Mitigation measures involving relocation are discussed on pages 1-18, 3-90 through 3-92 and in Appendix I-2 pages 1-5 and 1-9. Regarding locatees' livestock, as stated in the response on page 4-129 of the DEIS the lessee will be solely responsible for acquiring the necessary forage and water for displaced livestock. This remains a viable stipulation as the lessee could acquire the water and forage through purchase, lease, exchange, or other acquisition. Discussion on the effects of families relocated from their "kin groups" and the movement of family groups are listed on pages 4-130 and 4-131 under item 15.1. The relocation problem is one of the major concerns involved with proposed coal leasing and subsequent mining. The DEIS adequately analyzes these problems and issues arising from possible relocation of people residing on areas subject to surface mining. For further information on relocation refer to the beginning of this section under "Navajo Relocation".

11.6 See the response to comment 11.5.

11.7 The impact analysis in the San Juan River Regional Coal EIS is of a general nature, due to the extent of the area being considered for leasing and development. Specific information on relocation is not available at this stage of the leasing process and is, therefore, not available for impact analysis or public review. When this information has been compiled and presented in the lessee's mine plan, further environmental analysis and public review will be conducted as appropriate. Until then, tract-specific analysis is impossible. Also refer to the Navajo Relocation discussion at the beginning of Chapter 4.

11.8 See the response to comment 4.1.

11.9 See the response to comment 11.5. Also, refer to Appendix F, this lists the families that may have to relocate. See the Navajo Relocation discussion at the beginning of Chapter 4.

11.10 The BIM does not have information concerning the amount of grazing available on private and tribal lands. Even if the area was completely utilized for grazing, coal lessees could still obtain forage and water through purchase, lease agreement, exchange or other legal means of acquisition. Until the coal lessees start to acquire forage and water for displaced herds (at mine plan) the BIM has no information on the amount of land and water that could be available.

11.11 The unsuitability criteria are defined in 43 CFR 3461. Additional unsuitability criteria or changes in those currently defined in these regulations would require a change in the regulations.

11.12 Field inspections have been conducted on proposed lease areas. HLM is aware that some sites are inhabited only temporarily and that some areas are utilized seasonally. As mentioned, inventory of structures or cultivated fields will be conducted again at the mine plan stage.

11.13 Refer to the Vegetation and Livestock grazing section on pages 2-32, 3-15, 3-30, 3-61, 3-69, 3-75 and 3-80. The purpose of Appendix F is merely to identify residences on PRLA and competitive coal lease tracts.

11.14 During preparation of the first and Second Draft EIS's consideration was given to all the impacts that were identified. Impacts were then grouped to consider their importance. Significance of individual and grouped impacts was determined by ELM specialists during preparation of the DEISs. The degree of significance and the complexity of the impact were used by each specialist to establish the amount of presentation used. Site-specific impacts were identified where possible. Detailed site-specific impacts for all resources will be addressed in the EIS on the mine plan. Allocation of water and its determination of availability is the responsibility of the State Engineer. The State Engineer requires protection or replacement of existing surface or ground water and will not approve the mine plan until this is proven.

11.15 The table in Appendix A-11 refers only to new and additional inventories that were completed. Appendix A-11 states that ELM conducted an additional 10-15 percent inventory on 18 tracts while the School of American Research inventoried additional portions of two tracts. Consultations between the BLM, BIA and New Mexico State Historic Preservation Officer determined that the level of inventory in 12 of the tracts (Star Lake West 2, Hospah 1, Hospah 2, Kimbeto 1, Kimbeto 2, Bistl 1, Bistl 2, Bistl 6, Lee Ranch West, Sundance, Catalpa Canyon and Nageezi) was adequate for the application of Unsuitability Criterion 7. Therefore, 32 of the 39 tracts are now considered to have adequate inventory levels for leasing. Refer to Table 2-9 for the complete list of inventory percentages for each tract. Seven tracts listed in A-11 were considered to have minimal survey level and were not included in the additional inventory program. Table 2-12A of the final PRLA EA states the percent of each PRLA which has been inventoried for cultural resources. The ELM has sponsored two sample surveys within the Bistl-Star Lake Region covering the PRLAs (Huse, et al 1978 and Kemner 1981). These two surveys in addition to other previous surveys cover approximately 31 percent of the total PRLA area.

11.16 36 (CRR) Part 60.6 under criteria for evaluation of sites to the National Register states that: "... properties that have achieved significance within the past 50 years shall not be considered eligible for the National Register. However, such properties will qualify if they are integral parts of districts that do meet the criteria or if they fall within the following categories: ..." Seven categories are listed in which a property may qualify. We do not believe that most post World War II Navajo sites recorded meet any of these criteria. Most Navajo sites

dating from 1900 through the 1930's were found eligible for inclusion in the National Register. The National Register eligibility of the recorded sites were determined with the best data available. As more information becomes available the eligibility of these sites may be reevaluated, both for the eligibility for inclusion and the criteria of eligibility.

11.17 Assigning a site component to a cultural application was done by evaluating the available data on the site form. If the form stated the site was Navajo there was no basis, without revisiting the site, to classify it as another cultural group. This was also true with Anglo and Hispanic sites. Many of the historic sites recorded had not been assigned cultural affiliation and may be Anglo or Hispanic. Because the site recorder did not indicate the cultural affiliation the site had to be treated as unknown. Sites that have been found eligible for inclusion in the National Register will be considered in a mitigation plan. Through further research at these sites definite cultural affiliation may be determined.

11.18 On pages 1-16 and 1-18 of the Second DEIS under Committed Mitigation Measures the statements are made that the lessee must have conducted, and funded, an intensive cultural resources inventory (Class III) and ethnographic studies as part of the mine plan development. The Committed Mitigation Measures for cultural resources have been further clarified in the FEIS. (page 1-16). Section I-C1, of the Programmatic Memorandum of Agreement among the Department of Interior, HLM, OSM, and USGS and the Advisory Council on Historic Preservation regarding the Federal Coal Management Program, states: "A lessee or designated representative will be required, ..., to complete intensive field inventories of those portions of the lease tract, ..., that may be affected by lease-related activities ..."

11.19 The BLM has analyzed the worst case, destruction of the sites, in the EIS and, therefore, has not underrepresented the extent to which cultural resources in the San Juan Basin may be destroyed.

12H

Transcripts

2004G 23rd Street
Los Alamos, New Mexico 87544
November 15, 1983

State Director
Bureau of Land Management
Caller Service 4104
Farmington, New Mexico 87401

Dear Sir:

Attached is a retyped copy of my comments at
the November 8th hearing in Farmington on the Second San
Juan Basin Coal DEIS.

Yours truly,

Lillian Tenopyr
Lillian Tenopyr

November 8, 1983 - BLM Hearing on San Juan Coal DEIS in
Farmington, NM

My name is Lillian Tenopyr from Los Alamos. Although
I am a member of a number of conservation groups, I speak for
myself as a citizen of New Mexico. I came up from Los Alamos
because I believe that further coal PRLAs and competitive
leasing should be denied in the San Juan Basin until the Depart-
ment of Energy reevaluates the need for coal up to the year
2000. I also believe that the new DEIS cites enough hazards
arising from mining the basin to make this the last area in the
West to be mined and then only when the need is clearly in
sight. This land is too dry, too fragile.

My belief that the DOE estimates should be reworked
is reinforced by an article starting on Page 118 of the Novem-
ber issue of The Atlantic Monthly. This article outlines the
authors' research on the vulnerability to sabotage of United
States energy systems. The authors were commissioned in 1979
to make this research by the Pentagon's Civil Defense Prepared-
ness Agency. The article entitled "The Fragility of Domestic
Energy" does not, of course, concern San Juan coal, but portions
of it contain statements which cast strong doubt on the credi-
bility of federal government and DOE forecasts.

The authors, Amory and L. Hunter Lovins, point out
that by the year 2000, the federal government hopes that 500
million tons of coal - per year - will be obtained from the
Powder River basin, and that this is three-fifths as much as is
now mined each year in the U.S. as a whole. Is San Juan coal
really necessary? But perhaps it's required to meet the DOE's

forecasted need for 400 new giant coal and nuclear plants, even though present electric power plants have an over-capacity. According to the financial pages these days, nuclear plants cost too much. That leaves 400 coal plants. In the 16 years between January 1, 1984 and January 1, 2000, there are 532 weeks. Divide them by 400 and you get one new giant plant on line just over every two weeks. These are in addition to those not phased out and still working. If by the year 2000 there are that many people in the U.S.A. using that much energy, I hope I'm not around. There won't be enough food and water available in the lower 48 States to support this population increase.

Which brings me to reclamation potential and water. Chapter 3, Page 9, of the DEIS admits that "additional research over 5 or more years will be needed to have actual data" on self-regeneration of revegetation at the San Juan and Navajo mines, along with plant succession, plant diversity and tolerance for grazing use. The bottom line is - we won't know whether the San Juan Basin will become a desert or not for quite a while.

In connection with this admission, we have the wording of the paragraph on Reclamation under "Committed Mitigation Measures" (Chapter 1, page 16). It is: "Before mining will be allowed, each lessee will have to show that reclamation of the lands to its pre-mining productivity is economically and technically feasible. This requires the lessee to show how he intends to carry out revegetation and to submit studies and information showing that revegetation to a pre-mining level can be successful on a particular lease. Extensive bonding is required the lessee and is not released until reclamation success is proven. The lessee does not have to show absolute certainty of success,

but must show the success is likely." Now, I have a Safeway bingo card at home with 3 chips in each direction. Only the fourth chip is missing. Only one letter is missing in each city name. My chance of winning something is "likely," but I can't get a nickel from the bank on the basis of that bingo card. I view this mitigation measure statement, in the light of the previous admission that additional research on reclamation is needed, as Reclamation Roulette. And what is extensive bonding? If I were a smart mining company which had made a handsome profit from a coal lease and could absorb the loss of the bond and who couldn't prove a reclamation success, what would keep me from walking away from the mess?

As to water, the DEIS admits that "water used in its mining and reclamation process may not be available for other uses." It also admits that there will be "rapid population growth" under the No Action Alternative. It predicts "continuous increases in population" under Preference Right Lease Issuance and By Pass and the ensuing sections, - along with more water needed for mining - and, I assume, for reclamation - starting with $4\frac{1}{2}$ times as much than under No Action and working up to 6 times as much in the ^{High} Alternative. Who goes short - the newcomers, the present residents? And we still don't know where the water will come from. How much will be available? If the DOE can forecast energy needs, where are forecasts of water needs? Sloughing the problem off to the State Engineer's office is not the answer. But the problem must be answered before another lease is granted.

12.1

The doubtful need for coal, the doubtful reclamation potential and the doubtful sufficiency of water are only a part of the minuses in the San Juan Basin mining plan. The plus of additional income and employment opportunity is counterbalanced by a (and I quote) "a heavy financial burden on most communities and individuals." Increased population, increased problems, increased services. The DEIS admits there will be increased alcoholism, child abuse, etc. Under the Preference Right Lease Issuance heading it states that "Many of the communities will have to obtain funds from outside the region to meet population demands." (Roman numeral Page 15) Does that mean the State of New Mexico or the federal government? Which one will get with one hand and give with the other? In fact, reading the pluses and minuses on Roman numeral Page 15 of the DEIS, I cannot see what will be gained from mining this fragile land. I was left with the question "Is it worth it all?" and the reaffirmed conviction "there is no free lunch." Except, probably, for the mining companies.

Here I would like to add a remark in connection with those made by the second speaker. I, too, go back to the 1930's and can remember the dust bowl. I also remember that in the late thirties, a large portion of what was known as "the Third Avenue El" of New York City was torn down and the iron and steel sold to a giant steel company. That company turned around and sold it to Japan. We got it back all right, if not at Pearl Harbor then soon thereafter. Selling off our resources to benefit the economies of competing nations is not going to solve our balance-of-trade deficit - or any other United States deficit.

So what should be done with the San Juan coal? Well, I came across an article by an old chap who believes that gold is

a hedge against inflation. When asked "What do you do with gold when the gold market's down?" he replied, "You sit on it." And that's what should be done with San Juan coal - Sit on it until the United States needs it. Certainly, it must never be sold at Powder River prices.

In closing, I'd like to beg your indulgence as I sound off against two kinds of people who are on the other side of this issue. No. 1 is the person who says we're going to fall apart energy-wise if foreign oil is cut off. Since only one-tenth of U. S. energy comes from imported oil, I think we're capable of meeting this minor challenge if push comes to shove, without ripping up the San Juan Basin. Finally, there's the person No. 2 who piously cites the parable of the talents as an excuse for plundering - ocp, pardon me - developing America's natural resources. No. 2 completely ignores what happened to Esau.

Responses to hearing comment #12.

- 12.1 Water availability is discussed in Chapter 2, Tables 2-7 and 2-8, and Figure 2-6. Appropriations of water in the region are subject to the approval of the New Mexico State Engineer on a priority basis determined by time of application. Approval of new appropriations is contingent upon existing rights of water users. The estimated quantities of water needed for each alternative are presented in the EIS.

13H

Transcripts

John Redhouse

14H

Transcripts

Jerry DeGroot /BIA

No substantive comments.

COMMENTS

14.1

On 1-31 there's reference made to a civil lawsuit that has been filed on behalf of the Navajo tribe versus the State of New Mexico.

We would like to see some research done as to what the effects this would have on the PRLA leases and what stipulations in the lease could be made to where it is these leases would be subject to the decisions of the courts.

14.2

No. 2 on page 1-32, there is assumptions made that lands are available for the Navajo people. They are going to be relocated out of these coal mining areas. Well, we would like to see some further research done into exactly where these lands are that are supposedly available for relocation.

14.3

No. 3 on page 3-2, there are various assumptions made as to increases in the impacts and various things that were addressed in the assumptions, but there was no reference made to the Native Americans' concerns as to increases in population within the coal leasing areas, to increases in gravesites, and all the other Native American concerns that are within the PRLAs.

14.4

No. 4 on page 4-135, there's reference made to the moving and relocation of graves. I have never heard of such a ceremony that the Navajo people have that provides for moving gravesites.

4-135 states that sacred sites well identified, the Navajo Medicine Men Association will be notified, and other people will be notified. We would like to have included in the list in the BIA to be notified.

14.5

There are total acreage loss of what BLM calls AUMs that they've projected. That is based on a formula where the estimated carrying capacity of say, 160 acres -- the whole assumption is based on that, but a lot of these Navajos grazing on their own property have more livestock than what the formula would project.

So what we would like to see is a more accurate count of how much total livestock loss would be affected on the Navajos.

14.6

Under Appendix A-1 under tract summaries, there are wordings that we would like to see corrected. It says in some of those tract summaries that dwellings would be destroyed and relocation would be necessary.

From what I understand, the only time that a person could be affected is if he gives consent to the coal mining under the competitive coal leases, and this is quoted our to the direct summary for the Twin Buttes tract which is a competitive tract. There seems to be an assumption that the allottees will no say so as to whether they want the companies to come in there or whether they want their dwellings destroyed.

14.7 Another thing that we couldn't find was what steps will be taken to protect the other mineral resources that are available on the Indian allotments, that being affected by the PRLAs. An example, gravel. That's a mineral. So is red dog, which is common in the area, sand, oil and gas.

What steps or provisions will be made to protect those resources of the Navajos, because the way we understood it, the United States only preserved the coal. They have no other rights to the other minerals.

14.8 Lastly, there are other lawsuits that have been filed that would affect the PRLAs. As I've said in the beginning of my talk here, there was reference made to a civil lawsuit that was on file. I am aware of another lawsuit that has been filed recently which, if the courts rule in favor of the Navajos, the Navajos will gain back title to the coal. We would like to see that lawsuit addressed in the DEIS also.

Responses to hearing comment #14.

14.1 Federal law would take precedence over other actions proposed in the project area after the selection process is complete. Until the Navajo lawsuits are resolved in the courts, which could be a lengthy process, it is assumed that any final decisions ruled in favor of the Navajo Tribe would negate the leases issued by the BLM and that coal companies would be required to negotiate with the tribe. Projections of what could occur beyond this point would be purely speculative. Because of these points, impact analysis, mitigation measures, and stipulations are not included in the EIS or proposed lease stipulations.

14.2 See the response to comment 11.3.

14.3 The Assumptions section starting on page 3-2, Second Draft San Juan River Regional Coal EIS, lists various general and resource-specific assumptions needed to perform impact analysis throughout Chapter 3. Increases in the Native American population, gravesites, etc., that occur in the area are expected to continue and are discussed in Chapter 2, Affected Environment. This consideration was made during impact analysis development using as much data as could be obtained or developed. The assumption that the Native American communities and lifestyles existed or would continue to exist was not listed in the assumption section for the same reason that communities like Farmington and Gallup were not listed. Such communities and their lifestyles are a recognized part of the impact area but are not shown in the assumption section.

14.4 All such notifications to the Navajo Tribe will be coordinated with the appropriate Bureau of Indian Affairs Office. The procedure has been used before and is described in Navajo Graves An Archaeological Reflection of Ethnographic Reality by Albert Ewart published in 1980. Tribal rangers have removed graves for reburial. The procedures for sacred sites is described in Medicine Men Ethnographic Significance and Cultural Resources Management by David Doyel published in 1982.

14.5 As defined in the Glossary (GL-1) an AUM(1) is the amount of forage necessary to sustain 1 cow (or 5 sheep or goats) for 1 month; therefore 12 AUMs are necessary to support 1 cow, 1 horse, 2 elk, or 5 sheep, or 5 goats for one year.

This EIS analyzes the impacts to be legally permitted level of livestock. Refer to the Vegetation/Livestock Grazing Section in Chapter 3 for more information. Total livestock figures are not considered to be necessary to make a reasoned choice among the alternatives.

14.6 See the response to comment 5.1. Refer also to the Navajo Relocation section at the beginning of Chapter 4.

14.7 A land use planning decision based on rational BLM policy in the Chaco MFP (1981) requires that oil and gas development take priority over coal development if conflict occurs. For other common varieties of minerals such as sand, gravel, and red dog there are several options such as stockpiling the material or (if the allottee owns the minerals) selling to the lease operator for mine construction. These and other options can be pursued prior to mine plan development to the satisfaction of all parties involved.

14.8 See the response to comment 14.1.

15H

Transcripts

Ike Beyale

No substantive comments.

17H

Transcripts

Elliot Riggs

COMMENTS

- 17.1 One of the first things you learn in college when you first start studying fossils is that they are ubiquitous. They are every place.

Fruitland Outcrop is 300 miles long.

They focus on a small area, and they cannot tell you about the fossils that are existent in the rest of that outcrop area.

You'll find it's not all that great, mostly just articulated fossil debris, scattered occurrences, and if the national paleontological treasures are there, if they are there, like Dinosaur National Monument to the north of us, where are the great digs every summer, or the great universities?

16H

Transcripts

Frank Sandoval /Huerfano Chapter

No substantive comments.

Response to hearing comment #17.

- 17.1

Although it is true that invertebrate fossils are considered ubiquitous, well-preserved, research-quality vertebrate fossils are not. Their occurrence is relatively rare and it is well known that these fossils are relatively prolific in the San Juan Basin.

In recent years new types of vertebrates have been discovered and even new information about known types and their ecological relationships has been acquired. In fact, some of the fossil material recovered has been determined to be significant and continues to dominate research efforts in this area. Significance is not determined by the size of the "dig" like Dinosaur National Monument, but by the scientific relevance to evolutionary development through geologic time.

The literature on the paleontology of the area is voluminous and represents major international scientific books and journals. Dozens of scholarly papers are written yearly and the list of researchers who visit the San Juan Basin every summer is eminently respectable.

18H

Transcripts

Don Mosley/Utah International

COMMENTS

- 18.1 We don't agree that a worse case analysis would be required because right now there is a worse case analysis, and that is if the mining company did not reclaim the land, if they defaulted on it. The funds set aside and the bonding requirement then will be made available, and the federal government would see that the land was reclaimed and revegetated.

Responses to hearing comment #18.

- 18.1 CERQ regulations (40 CFR 1502.22) requires worst case analysis be conducted where there is incomplete or unavailable information. We appreciate you input.

19H

Transcripts

John Cole/First National

No substantive comments.

20H

Transcripts

Ed Goff

No substantive comments.

21H

Transcripts

Carol Garner/Crownpoint Citizens Alliance

COMMENTS

- 21.1 I feel it is inappropriate for the BLM to finalize the Environmental Impact Statement and submit it to their superiors at the Department of the Interior prior to the reporting of the findings of the commission on the fair market value to Congress. The Department of the Interior and the public cannot know what subsequent actions Congress will take.
- 21.2 The draft has managed once again to compile an impressive list of expected adverse impacts, some of which include increased rate of alcoholism, drug abuse, family violence, suicide, other forms of mental health impacts, increased traffic accidents and related deaths, increased stresses on water supplies and sewage facilities in the community, and probably inadequate housing, police and fire protection, and schooling facilities but the accompanying discussion of mitigating measures is wholly inadequate.
- 21.3 The sections addressing relocation impact, particularly from pages 3-91 and 3-92 are the worse sections of the draft. Mitigation measures suggested include ludicrously inadequate monetary compensation for relocation to sites which have not been secured or even identified as available.
- 21.4 One further serious problem with this draft is the number of times BLM admits that information needed upon which to base decisions is just not available.

21H

Transcripts

CROWNPOINT CITIZENS ALLIANCE

P.O. BOX 155 • CROWNPOINT, NEW MEXICO 87313

TO: State Director, Bureau of Land Management

FROM: Carol E. Garner, Crownpoint Citizens Alliance

DATE: November 17, 1983

RE: Comments on the Second Draft San Juan River Regional Coal Leasing Environmental Impact Statement

I am submitting these comments on behalf of Crownpoint Citizens Alliance. The comments represent our critiques and concerns on the subject of socio-economic impacts and associated American Indian Concerns as published in the Second Draft EIS. At other hearings and during other comment periods, I have criticized the previous DEIS on several points:

- * there was a lack of concrete proposals for mitigation of expected adverse socio-economic effects resulting from the coal leasing and mining.
- * there was a need for information regarding what has happened to other regions affected by massive energy development.
- * there was a need for discussion of types of skills necessary for employment and intentions of the companies and federal government to provide adequate training programs so that the vast majority of jobs provided may go to Navajo residents desiring jobs.

Before I discuss some specific problems with this Second DEIS, I want to comment upon several general problems with critiquing the DEIS.

I feel it is inappropriate for the BLM to finalize the EIS and submit it to its superiors at the Department of the Interior prior to the reporting of the findings of the Linowes Commission on Fair Market Value Policy to Congress. The Department of the Interior and

the public cannot know what the Commission will recommend, nor what subsequent actions Congress will take. There is a temporary ban on lease sales until ninety days after the Commission reports. Given the delays incurred so far, postponement of the finalizing of the EIS a while longer will not cause damage. It may actually save wasted effort in time and resources should the Commission's findings and Congress's actions require yet another revision of BLM recommendations.

It is also difficult for individuals and groups to assess BLM recommendations and the Department of the Interior actions which might result given the change in the leadership of the Department of the Interior. BLM recommendations may or may not be considered by the new Secretary. My criticisms and concerns may or may not be borne out under the new Secretary.

Additionally, I would like to comment upon this most recent round of "public participation" hearings. Once again, inadequate review and preparation time has been allowed the public for studying this DEIS and to present comments. I also charge that a decision to hold only one hearing, in Farmington, was a deliberate move to stifle public participation. The input of Navajo people most directly affected by the coal leasing should be vital to adequate review of this Second DEIS. For the majority of Navajos, their input needs to be in oral fashion because of an unfamiliarity with the written English language. However, there was no hearing situated in Navajo land holdings.

Also, holding one hearing, in Farmington, effectively curtailed visible public participation from the many Albuquerque-Santa Fe-Taos individuals who have demonstrated previous keen interest in the DEIS.

I will now address specific inadequacies with this Second DEIS. After reviewing the DEIS, I do not feel the issues raised previously have yet been adequately addressed. The DEIS has managed once again to

compile an impressive list of expected adverse impacts, which include increases in:

alcoholism, drug abuse, family violence, suicide, divorce, crime, depression, traffic accidents & related deaths, stresses on water supplies & sewage facilities, inadequate housing, police & fire protection, & schooling facilities.

Yet the accompanying "discussion" of mitigation measures is wholly inadequate. The DEIS proposals and comments take one of several approaches.

The section on Alternative Mitigation Measures (pp. 3-84 to 3-92) outlines "actions that might be taken to further reduce the adverse effects of the proposal." (p. 3-84) But these actions are in no way guaranteed. The DEIS says that "these measures could be required by BLM, BIA, OSM, or the State of New Mexico." (p. 3-84) It further states "the BLM feels that these standards are not legally required..." (p. 3-92)

Chapter 3 on Environmental Consequences is full of statements and recommendations for mitigation measures which entirely lack credibility. On pages 3-23 and 3-24, there is a good discussion of anticipated adverse impacts on the Navajo people living in the San Juan Basin. But there is no credible suggestion as to how these adverse impacts can be mitigated. As I said earlier, the section on Alternative Mitigation Measures provides no binding or legal means for provision or enforcement of needed services.

Discussion of job and economic benefits quite clearly lay out expected benefits for the towns adjacent to Navajo lands: Gallup, Grants-Milan, the Farmington triad, and Cuba. The information also clearly points out that there are no guarantees or legal assurances possible that jobs or other economic benefits will come to Navajo residents of the Basin. On page 4-132, the DEIS claims:

Local residents will be provided an opportunity to apply for jobs regardless of ethnic origin. Beneficial economic impacts would occur to Navajos who have or can obtain the necessary

job skills. The number of Navajos that possess these skills is not available. . . . The BLM's authority to specify or require that a preference be given to Navajos in hiring them or that training be made available is unclear." (emphasis added)

And further, while BLM recommends a possible mitigation measure in specific leases for preferential Navajo hiring, again BLM questions its own legal authority to require such a protection. (pp. 3-89 & 3-92)

The information also suggests that rather than economic benefits, the Navajos will suffer economically from coal mining. From page 3-42, there is an implication that the influx of in-migrants is likely to take jobs away from Navajos. On page 3-24 there is a discussion of the increased inflation associated with the mining that will cause further economic suffering for many Navajos living on fixed or limited incomes.

Beyond identifying these expected adverse impacts, there is no discussion as to where support, monetary and infrastructure-wise, will come from.

The sections addressing relocation impacts, particularly from pages 3-91, 3-92, and 4-129 to 4-131, are the worst sections of the DEIS. Mitigation measures suggested include ludicrously inadequate monetary compensation for relocation to sites which have not been secured or even identified as available. Tied up in the relocation issues are the issues of adequate water and grazing resources, which are known not to exist within the San Juan Basin.

Another serious problem with this DEIS is the number of times BLM admits that information needed upon which decisions and recommendations are being or might be based is just not available. The following references regarding admissions of unavailable or inadequate data are taken primarily from the sections addressing socio-economic impacts and American Indian Concerns:

I will conclude my comments by voicing a concern that the policy makers are grossly distorting their public duty by outlining the substantial adverse impacts, suggesting feeble, non-binding, potential mitigation measures, and then asserting that alleged economic and public benefits will overcome the expected and assured adverse impacts.

Finally I close with some comments about the lack of power and lack control so many of us living in these affected communities are feeling. It is quite clear that there are "...extensive efforts on the part of the powerful interest groups such as government agencies and big business, in their attempts to preempt conflict," to rationalize the changes, and to influence ambivalence in the decisions to be made." We are forced to "...recognize the power and influence of the energy companies, a government determined to increase domestic energy production, and other sectors that expect to profit from energy development." And in our own communities "...energy development means that the major employer and the major economic force in the community resides outside the community; the energy companies themselves have little concern for the community beyond how it contributes to profitable energy development..." We find that, all of a sudden, "...more and more of the stores and organizations will be based outside the community, and the community will become increasingly dependent upon outside financial and technical assistance."** And it is easy to ignore the fact that, one day, these outside interests will lose interest in our communities when the coal is gone and our land is destroyed and they will leave. All of the so-called benefits will be gone, and we will be left without economic supports, without jobs, and without our land.

Going ahead with the proposed leasing and mining, given the lack of proven need, contrary to BLM assertions, is an ultimate violation of public trust.

** Quotes taken from: The Boom Town: Problems and Promises in the Energy Vortex; Joseph Davenport III & Judith Ann Davenport; 1980; University of Wyoming Department of Social Work

PAGE	LINE	COMMENT/RESPONSE
2-42	3,4	"Actual recreational use data for the region <u>is not available</u> ;"
2-45		Entire chart is referenced to the year 1979. This is out of date and therefore not useful.
2-47	1,2	"The transportation plans of local and regional governments focus on the need for increased maintenance and improvement of roadways." These are current needs, not taking into account future demands. Therefore the information is inadequate.
2-57	3,4	"Many families travel <u>several</u> miles to the nearest source of water..." "Several miles" is an inadequate description of the impact of hauling water anywhere from 5 to 50 or more miles.
2-57	13,14	"It is assumed that clusters of residences on the tracts probably reflect residence groups, but this <u>has not been confirmed</u> by field interviews."
2-58	5-7	"...it is anticipated that <u>an unknown number of Navajo families</u> from the former Navajo-Hopi Joint Use Area in Arizona <u>will be resettled</u> on lands selected by the Navajo Tribe on or around the competitive coal lease tracts."
2-58	10	"The location of water is a critical factor..." The "critical factor" is not adequately defined nor is the impact of increased usage of water on a region always experiencing critical water availability.
3-1	15-17	"The site-specific impacts...will be analyzed in more detail in environmental documents..." Without the specific actions available for study and discussion now, one cannot intelligently analyze the adequacy of the actions suggested.
3-1	28,29	"Impacts beyond the year 2000 are too speculative to analyze." BLM will not speculate on some impacts to be anticipated beyond the year 2000, but it will speculate (in the face of no substantiating data) that lands will be available for resumption of recreational and grazing activities 30 to 40 years from now.
3-3	23-25	"All active mines would be inspected..." The federal government and the State of New Mexico had difficulties keeping up with uranium-related inspections. Where is evidence to suggest these governments would be any more successful in monitoring coal mining?
3-20	27-32	The highway use figures are presented as totals; Table 2-11 is broken down by individual highways and road sections. Therefore the figures from p. 3-20 and 2-46 are not comparable.

PAGE	LINE	COMMENT/RESPONSE
3-26	16-23	Without the ability to study lease stipulations along with the proposals of the DEIS, it is impossible to assess recommendations or inadequacies with sufficient attention.
3-42	30-35	"The source of funding for these expenditures <u>was not analyzed</u> ,... An increased tax base would be available for most counties." If the source of funding was not analyzed, then it is impossible to say if the source would continue and whether, despite an increased tax base, the community would actually be able to maintain services.
3-48/49		Tables 3-18 & 3-19: Crownpoint and Thoreau do not share water sources or wastewater treatment facilities; therefore the combined figures are useless for anyone's analysis.
3-51	27-31	"Total disturbance...is not known and cannot be adequately projected." If BLM does not know total disturbances and does not know where affected residents will be located, then little can be credibly discussed regarding expected impacts or mitigation measures.
3-83	36-39	"Detailed impacts...will be analyzed at the mine plan stage of the leasing process." Waiting until the mine plan stage is a serious flaw in analyzing and discussing expected impacts and mitigation measures. It is impossible at this point. Therefore the DEIS is remiss and insufficient.

PAGE	COMMENT	QUOTE AND/OR RESPONSE
4-117	14.2	"Localized data on Navajo employment figures and skills <u>are not available</u> ..."
4-118	14.4	"An increase of such problems might be expected to occur, but <u>the degree of significance can not be determined</u> at this time." <u>This is an inadequate and insufficient response</u> for the purposes of this document.
4-119	14.6	"...income sources <u>are not available</u> from the presently published 1980 census."
4-119	14.7	"Data <u>is not available</u> to estimate the number of people who could qualify for mining jobs."
4-119	14.8	The response to this comment refers to BLM's response to Comment 14.4. The response at 14.4 was inadequate and insufficient to begin with and continues so as a response here.

PAGE	COMMENT	QUOTE AND/OR RESPONSE
4-120	14.9	Reference to future leases to be negotiated are not sufficient to qualify as a discussion of mitigation measures; nor is such a reference sufficient to address affected people's concerns and fears regarding relocation.
4-120	14.10	"Average wage and payroll figures <u>were not calculated</u> since personal income <u>was not analyzed</u> ." This response provided inadequate and insufficient data for either BLM or anyone else reading this DEIS to analyze.
4-126	14.30	"Specific relocation costs will not be developed until specific mining operations are developed and submitted in a mine plan for each leased tract. ...this information will not be available until environmental analysis are prepared on the mine plan." The unavailability of this information is a critical defect and lapse in the information which should be presented in this EIS.
4-127	14.33	The response referred to at Comment 16.35 simply says "The text has been revised." Nowhere in the text does BLM raise "the question...as to whether the benefits generated for the very few as a result of these projects, really warrant the long-term costs which will be borne by a much greater number of people, including many segments of the population who can least afford them." Therefore the response at 14.33 is facetious.
4-127	14.34	This response underscores the uncertainty of this whole coal leasing and mining operation. In the face of such uncertainty, BLM should have made a more credible effort to estimate or compose a model to account for such variables.
4-127/8	14.36	"Housing data by Navajo Chapter is not available." The continued unavailability of information leads to the assumption that BLM is basing decisions upon its own biases and conclusions not based upon any documentable data base.
4-129 to 4-132	15.1	This entire Comment Section is facetious, spurious, and wholly inadequate. The section allows as how BLM "cannot accurately determine" who is to be impacted, nor to where relocation is to occur. Compensation is wholly dependent upon the largess of the lease holder. This approach to managing the problem of relocation is a gross breach of public duty and trust on the part of BLM and the Department of the Interior should it adopt the BLM recommendations.

The attitude toward preferential hiring and training of Navajos is an abrogation of justice and moral duty to enhance the lives of people most drastically affected by the proposed mining.

PAGE	COMMENT	QUOTE AND/OR RESPONSE
4-133	15.5	"The specific individuals who would be affected by coal development would be determined and analyzed in specific environmental documents prepared on mine plans submitted on specific tract(s) by the lessee." Again it is asserted and is still unacceptable that specific individuals to be affected cannot be determined until some point in the future.
4-134	15.9	The DEIS treats the issue of the Navajo Tribe's selection of lands for resettlement of people from the JUA without appropriate solemnity and sloughs off the implication of this land selection on the coal leasing.
4-136	15.15	"A total number of qualified surface owners that will or will not refuse to give their consent to allow coal mining on their property <u>can not be determined at this time and specified in the EIS</u> ." The determination of these people is critical to several stages of the coal development and should be determined before decisions to proceed are finalized.
4-139	15.26	Again it is asserted and is still unacceptable that specific individuals to be affected cannot be determined until some point in the future.
4-141	15.32	"...this would be too remote and speculative to adequately address." The issue of Navajo employment and tribal regulatory authority are critical issues for the Navajo Tribe and its people. Good faith efforts should be made to more adequately provide for Navajo employment at the mines.

Responses to hearing comment #21.

21.1 The EIS is developed to identify and analyze the impacts that would occur in the development of Federal coal. The Kinowes Commission will be reporting on fair market value which may affect the lease sale. We believe the report will not significantly affect relationship between the two documents.

21.2 Front end money or other types of company contributions to provide facilities and/or services could help mitigate adverse impacts. BIM has no authority to require these measures as part of the lease. However, local communities can negotiate with the companies to meet some of these needs. (The State Legislature could also grant severance tax funds to local communities to help meet their needs.)

21.3 As mentioned in the discussion on page 3-92, this mitigation measure was proposed by the BIA and would be used for only the unauthorized occupants. When actual determinations are made as to which families, if any, will have to relocate, the lessee and occupants, along with assistance from the Navajo Tribe and BIA, will make that determination. Similar procedures were used to move Navajos living in the area of the Navajo Irrigation Project.

21.4 CEQ regulations 40 CFR 1502.22 discusses what the National Environmental Policy Act (NEPA) process requires when there is incomplete or unavailable information. These regulations state:

"When an agency is evaluating significant adverse effects on the human environment in an environmental impact statement and there are gaps in relevant information or scientific uncertainty, the agency shall always make clear that such information is lacking or that uncertainty exists.

(a) If the information relevant to adverse impacts is essential to a reasoned choice among alternatives and is not known and the overall costs of obtaining it are not exorbitant the agency shall include the information in the environmental impact statement. If (1) the information relevant to adverse impacts is essential to a reasoned choice among alternatives and is not known and the overall costs of obtaining it are exorbitant or (2) the information relevant to adverse impacts is important to the decision and the means to obtain it are not known (e.g., the means for obtaining it are beyond the state of the art) the agency shall weigh the need for the action against the risk and severity of possible adverse impacts were the action to proceed in the face of uncertainty. If the agency proceeds, it shall include a worst-case analysis and an indication of the probability or improbability of its occurrence."

This is the procedure the BIM has followed. Much of the information requested is not needed for a reasoned choice among the alternatives and because this EIS analyzes the issues in a general manner. The specific information requested will be generated at a later time when the issues:

21.4 are more clearly defined. This document is tiered to subsequent documents that will be prepared at mine plan. This is entirely proper as discussed in CEQ regulations 40 CFR 1508.23. "Tiering is appropriate when the sequence of statements or analysis is: a) From a program plan or policy environmental impact statement to a program, plan, or policy statement of lesser scope or to a site specific statement or analysis. (b) From an environmental impact statement on a specific action at an early stage ... to a ... subsequent statement or analysis at a later stage (such as environmental mitigation). Tiering in such cases is appropriate when it helps the lead agency to focus on the issues which are ripe for decision and exclude from consideration uses already decided or not yet ripe." The entire Federal coal lease program is based on a tiering concept. When the coal program was first developed, an EIS was prepared and entitled: Federal Coal Management Program. After this EIS was completed the regional coal leasing EIS's were (or are being) prepared. This EIS is one of the regional coal EIS's. This EIS focuses on general issues and concerns and site-specific information that is important to making a decision. The BIM believes there is adequate information presented in order to make a decision.

The BIM has obtained a significant amount of site-specific information in preparing this EIS; for example: The BIM has completed extensive cultural resource inventories. A study discussing potential mitigation on Chacoan roads was recently published by the BIM. Extensive helicopter and field surveys were completed to locate residents on coal tracts. Field interviews were conducted in Navajo with residents to locate grave sites and sacred areas, and inform residents of their rights with respect to coal leasing. A surface owner determination contract was also issued. The BIM requested the U.S. Geological Survey, Water Resource Division to assist by making engineering estimates of changes in the water levels and flows in various aquifers caused by ground water withdrawals. A wildlife contract was issued to develop a significant species list, inventory special habitat features, and conduct a wildlife species inventory in surface mining areas. A contract to determine the impacts to air quality PRIAs has been added to the Final EIS. The BIM has obtained extensive specific information.

At this time the BIM does not know the precise tracts (if any) that would be leased. The Regional Coal Team will submit to the Secretary of Interior a list of those tracts recommended for leasing. There is a large pool of tracts which the Regional Coal Team can select from. The factors which will be used in choosing these tracts are: environmental, economic, social, and whether or not surface owner consent has been obtained. Without knowing exactly which tracts will be leased, developed, and what the mine configuration will be, BIM cannot determine specific details for a number of issues; for example: the exact occupants that will be required to relocate, where residents will relocate, or the number of residents that will choose to relocate; i.e., authorized occupants, the exact acreage that will be disturbed, the exact number and kind of cultural sites that would be disturbed, and/or the exact water requirements needed for coal development. The BIM has enough information to make a reasoned choice among the alternatives because these issues were analyzed as a worst-case.

21.4 (cont) In addition, the cost of obtaining specific information, that many commentators requested would be exorbitant to obtain; for example, if ELM had to conduct 100 percent cultural resource inventories prior to leasing the cost would be exorbitant. Cultural inventories cost approximately \$12.00 per acre. Considering the High Altitude covers 68,641 acres, the total cost would be approximately \$823,700. The ELM would obtain an enormous amount of cultural data on areas that ultimately would never be mined.

It is also important to note that in many instances ELM has retained the right to preclude mining by stipulating that mining would not be allowed if certain cultural sites or grave sites were found and could not be lawfully relocated or threatened and endangered species were identified. Obtaining detailed information on many of these site-specific issues would be expensive, and ultimately much of the area would never be mined.

When environmental documents are prepared on the individual mine plans many more of these important issues will be ripe and ready for analysis. Also the lessee must meet the standards of the Surface Mining Control and Reclamation Act. If these standards are not met, mining will not occur. If a lessee is unable to obtain adequate water supplies no mining would occur. This is not to imply that ELM does not need to analyze these issues, but that the issue is analyzed in a general way. That is, is there enough water rather than where specifically will the water for each mine come from.

21.5 See the response to comment 9.4.

21.6 See the response to comment 21.2.

Transcripts

2.



DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE
HEALTH SERVICES AND MENTAL HEALTH ADMINISTRATION

NAVAJOES
INDIAN HEALTH SERVICE
SAN JUAN HOSPITAL
SPOONSTOWN, NEW MEXICO 87033

November 17, 1983

State Director
Bureau of Land Management
Caller Service 4104
Farmington, NM 87401

Dear Sir:

I am writing you as the Clinical Director of the Crownpoint Service Unit of the Indian Health Service. The Crownpoint Service Unit is the Division of the Indian Health Service which provides the health care for about 17,000 Navajos living in a 3500 square mile area of the San Juan Basin. Our area of responsibility includes nearly all of the residents in the proposed PRLAs, competitive coal lease tracts (except those immediately surrounding Gallup and La Plata) and the NMGS. Within that area, our clinics are the only full time providers of health care and our hospital is the only one within a diameter of about 150 miles. Our responsibility for the people we serve is to provide as full a range of health care services as possible and to act as a spokesperson for their health care needs. In this capacity, I come to you to review a number of detrimental impacts of the proposed actions on the health of the people of this area which were inadequately covered in the second draft EIS for San Juan Regional Coal Leasing.

Presumably in response to criticisms of the first draft EIS, this second draft has referred to expected areas of increased morbidity if the proposed development takes place. Included in the areas where health can be expected to deteriorate are: injuries from spouse abuse, injuries from child abuse and neglect, illness and injury related to alcohol and drug abuse, injuries from assaults, and injuries from vehicular accidents. Although as an Indian Health Service physician my principal concern is with the Navajos we serve, it should be noted that this draft EIS is in error in discussing these effects only under the heading of American Indian concerns. All of these effects will occur with all those whose lives are affected by the boom/bust cycle of energy development no matter their ethnic background. Unquestionably the effects

22.1

will be magnified on the more traditional residents of the area by the cultural and ethnic clashes which will inevitably occur.

Despite the fact that this second draft EIS has been amended to give recognition to the variety of adverse health effects of the development, the BLM has still not proposed any mitigating measures for these effects. The BLM has the authority to include in its leases terms providing for mitigating measures when it identifies adverse effects. Despite the fact that these adverse health effects are clearly significant impacts, and have been shown to occur in areas of similar development (Davenport, Davenport, 1980 - See first Draft EIS), the BLM has failed to propose mitigating measures. A number of measures could have been proposed; for example, companies could be required to contribute by percentage to special health care or mental health programs sited in the immediate area to benefit employees and residents of the area, they could be required to incorporate alcoholism treatment and prevention programs to serve employees and nearby residents, they could be required to provide crisis intervention and spouse abuse programs, they could be required to provide long term counseling services to the traditional people who will be forced to be relocated from their homes by the stripmining. Any of a number of actions could be proposed as mitigation measures.

22.2

In this second draft EIS, the BLM has made note of the fact that the Crownpoint Service Unit of the Indian Health Service is already understaffed and underfunded in relation to current need, and will be unable to adequately meet the increased need to result from the mining and related development. However, it fails to mention the difficulty of the health care system in adapting to changing need. The fact that our budget is set by Congress without regard to the economic law of supply and demand reduces the flexibility of our system to respond rapidly to changing needs.

22.3

An additional area of concern is with the health effects of forced relocation of traditional Navajos. As noted on Page I-11 of this second draft EIS, the Secretary of the Interior is not obligated to follow any of the recommendations regarding choice of alternatives. Given the interest in maximal development of resources by this administration, it would seem reasonable to assume the High Alternative might be chosen. Under this circumstance, over 3000 Navajos may be forced to relocate according to the BLM's figures. The EIS only very briefly refers to the mental health stresses which will result from this. If one even assumes, as the BLM does, that adequate sites for relocation can be found for all these people to allow them to continue to pursue their lifestyles, there still can be expected to be extensive effects from leaving homes they have occupied for generations and observing the

Responses to hearing comment #22.

3.

destruction of the land they hold sacred. As has occurred elsewhere when Navajos have been forced to be relocated, measures of mental illness will increase. Again, the BLM has not proposed any mitigating measures to address the mental health effects of this forced relocation.

To summarize then, while the BLM has corrected some of the deficits of the first draft EIS in regards to health effects of the proposed developments, it has failed to propose any mitigating measures for these effects. A number of possibilities for such mitigation exist but have not been proposed by the BLM. This is despite the fact it has acknowledged the inability of the existing health care system to meet these needs.

Sincerely,



Robert Williams, M.D.
Clinical Director
Crownpoint Service Unit

22.1 Your comment is correct in that all ethnic groups will be impacted by these effects. However, the magnitude of these impacts is not expected to reach significant levels except with the traditional American Indian groups.

22.2 See the response to the comment 21.2.

22.3 We acknowledge that the health care system may have difficulties adapting to increased needs for the reasons mentioned.

Transcripts

Elizabeth Matthews /Crownpoint Citizens Alliance

COMMENTS

- 23.1 There's still as yet been no true cumulative overview of environmental impacts released. To be adequate, such an overview must contain all coal related development. All potential uranium development, and all potential power plants. This must include federal, state, and all tribal related developments.
- 23.2 We also believe that the inventory of scared sites provided is incomplete.
- 23.3 In the section on the American Indian concerns, EIS states very frequently that there is no data available, for example in the number of Navajos with the necessary job skills that would be allowed to take jobs in the mines, and we feel that is an irresponsible skirting of the issue, to have no documentation for essential issues that need to be considered.
- 23.4 In the discussion of air quality standards, we feel it is often confusing, and there is no reference made to the required EPA analysis if the PSD standards are exceeded.
- 23.5 The unsuitability criteria number one, has not been applied, as evidenced by lack of definite plans for the exact location of the Continental Divide scenic trail.
- 23.6 There is no scientific evidence presented for the cumulative effects of the mining on either the Chaco Canyon National Park or the remaining Bisti Badlands. These fragile structures are extremely sensitive to vibration air quality changes, and yet there is no review of the cumulative impacts upon them.

Responses to hearing comment #23.

- 23.1 See the response to comment 8.1.
- 23.2 Refer to response number 15.13 on page 4-135 of the Second DEIS. We are aware that the number of sacred sites is underestimated and that Navajos are reluctant to disclose the specific locations of these sites. However, at lease 180 days prior to conducting coal mining operations, the lessee is required to contact the Navajo Medicine Mens Association and the Navajo Chapter to provide an opportunity to inventory and conduct mitigating actions for sacred areas.
- 23.3 See the responses to comments 9.1, 11.3, and 21.4.
- 23.4 Normally a coal mine does not produce enough emissions to be subject to a PSD permit. If a specific operation is determined to be subject to the PSD permit process, then a site-specific analysis will be done.
- 23.5 Unsuitability Criteria Number One has been applied to the Continental Divide National Scenic Trail. Refer to the Unsuitability Criteria Section pages 1-20 and 1-22 in Chapter 1.
- 23.6 At this time the exact impacts to Chaco Canyon and the Bisti are unknown. There is a general discussion of impacts of vibration to Chaco Canyon on page 3-34. The cultural resource stipulation discussed on page 1-17 requires a monitoring program which will be approved by NLM in consultation with the National Park Service.
- The impacts to Bisti are discussed on page 3-19. Impacts due to vibration on competitive or PRLA tracts are not anticipated to be significant. The most significant impacts of vibration on the Bisti are expected from the Gateway Mine, and the adjacent existing leases. The impacts from the Gateway Mine on the Bisti were analyzed in the mine plan. It should also be noted that the landscape in the Bisti WSA (unlike Chaco Canyon's Cultural resource sites) is always changing due to natural erosion. The soft shale and siltstone formations are eroded and new formations are constantly being created.

23H

11-17-83

To: State Director
Bureau of Land Management
Caller Service 4104
Farmington, N.M. 87401

Re: Second Draft of the Environmental Impact Statement
San Juan River Regional Coal E.I.S.

I would like to make several points on specific areas where this draft EIS is inadequate.

1) None of the material is released in a form which is readable by the average citizen, given its highly technical nature. This makes the public review process inadequate.

2) The period of time between release of the documents and the public hearing at Farmington was too short for average citizens with jobs and other responsibilities to review the material and prepare comments.

3) Having only one hearing also limited the opportunity for citizens to comment on it.

4) There still has yet been no true cumulative overview of environmental impacts released. To be adequate, such an overview must contain all coal related developments, all potential uranium related developments, and all potential power plants. This must include Federal, State, and Tribal related developments. To fail to look at the complete picture presents a distorted, misleading evaluation of the impacts of each. In the past the PLM has stated that it has no authority to conduct such a broad review.

However, it certainly has the authority and the responsibility to convene a meeting of all agencies with responsibilities in the area and initiate such a review. In the context of failing to address these broad issues, all of the EIS's under review are distortions.

5) There is inadequate data to support the statement that reclamation can be successful in this arid region of poor soils. As the Regional Coal EIS itself notes (p3-9), no lands have yet been through a full revegetative cycle and returned to full grazing. To propose leasing before this is proven possible is irresponsible. Long term plant diversity, self regeneration and tolerance for grazing are still uncertain. This could mean permanent defoliation of 90,000 acres of land.

6) The regional Coal EIS admits that as many as 3000 Navajos may be forced to relocate in what would become the Third Long Walk. There is no discussion of where these people

- 2 -

will be moved to that would preserve their lifestyle and grazing rights. As the Joint Use Area relocation has shown, it has not been possible to find sufficient space to relocate these thousands of Navajos. We suspect that the DLM has no answer to this question, and for this reason only discusses it in superficial, vague and misleading terms. The DLM seeks to evade its responsibility by glossing over this issue.

7) The suggestion that mining will improve paleontological study, by removing the upper layers of earth is ridiculous. Drag lines will not stop after each pass to let the scientists study the underlying debris. Valuable archeological information will be lost forever with mining.

8) The unique fossil forest area still receives no special treatment in the EIS. It is an area of high scientific interest and should be preserved as a wilderness area.

9) In the sections on American Indian Concerns, the EIS says there is no data available concerning the numbers of Navajos with the necessary job skills that would enable them to get jobs in the mines. In other sections on the American Indians they also comment "no data available" and then drop the discussion. It is totally irresponsible to have no documentation of essential issues. If you have no data, go get it! You cannot use that as an excuse to skirt issues that will affect thousands of Native Americans.

10) It is hardly a mitigating factor to suggest that the mines offer Navajo preference in hiring and provide job training for Navajos when the BLM has no legal force to guarantee it. (p4-132,3-89,3-92).

11) The concept of creating small islands of intact land around sacred sites is inadequate to meet the spirit of the American Indian Religious Freedom Act. We also believe the inventory of sacred sites to be incomplete.

12) The concept of small islands of land surrounding the nests of eagles and hawks, both of which are endangered species, is also inadequate. It is hard for us to believe that an eagle will nest on a little island surrounded by drag lines and trucks.

13) The discussion of air quality standards and prevention of significant deterioration of total suspended particles is confusing. No reference is made to the required EPA analysis if PSD standards are exceeded.

14) Unsuitability Criteria #1 has not been applied, as

24H

Transcripts

James Hornbeck/Celsius Energy

No substantive comments.

evidenced by lack of definite plans for the exact location of the Continental Divide Scenic Trail. This is clearly in violation of the spirit of the law.

15) No scientific evidence is presented of the cumulative effects of the mining on either Chaco Canyon National Park or the remaining Bisti Badlands. These fragile structures are extremely sensitive to vibration and air quality changes, yet there is no review of cumulative impacts upon them.

16) It is hard to summarize all these points but I think the message is clear: the current EIS is still inadequate, in its failure to respond to specific issues and needs of our area.

17) Finally, even if the EIS were "adequate" in responding to these issues, it still does not provide sufficient justification for the many adverse effects of stripmining this culturally and geographically unique area.

Elizabeth Matthews M.D.
Elizabeth Matthews M.D.
P.O. Box 637
Crownpoint, N.M. 87313

Spokesperson for self and
Crownpoint Citizens Alliance

Addendum:

18) The mitigation measures addressing relocation impacts (p. 3-91, 3-92) are grossly inadequate. They suggest ridiculously low monetary compensation for relocation to sites which have not been secured or even identified as available!

Elizabeth Matthews M.D.

25

(Typed for Reproduction Purposes)

To: State Director
From: Willie H. Martinez
Negeezi, NM

Subject: Coal Mining or Rail Road Co.

My comment is, its possible to mining and construct new Rail Road in Navajo Indian county.

But, numbers of people are gone hurt, cause they have grazing rights to pasture on public domain land, live there all their life, and therefore requesting for new stock pasture for those people are to Relocate and new House, We need the two companies to Buy stock pasture land and Buy Land, where all they can be relocated.

We need majority of Navajo people to be Employ next in Both company and we want no Bar alone the line appreciate to consider by comment
Thank You
signed Willie H. Martinez
11-3-83

No substantive comments in letter #25.

26

dugan production corp.

November 10, 1983

State Director
Bureau of Land Management
Caller Service 4104
Farmington, NM 87499

Re: San Juan River Region Coal
Environmental Impact Statement

Gentlemen:

This letter is written in response to the opportunity to comment on the second draft of the above referenced matter which sets forth alternative courses of action regarding coal leasing and development activities in the San Juan River Region.

The purpose of this letter is to state a belief that the economic, political and sociological interests of our state and our nation will best be served by the selection, and pursuit, of a course of action which permits reasonable and rational coal leasing and development activities, now.

Our nation's dependence upon foreign energy sources is a well-documented fact. This dependence places our nation in a vulnerable position -- a position from which it should do all that is possible to extricate itself.

The executive branch of our government has clearly stated its position on this issue. It has adopted a policy which calls for the development of our domestic energy resources in an effort to reduce our dependence upon foreign energy sources. We have witnessed the implementation of that policy in some areas, e.g. increased oil and gas leasing activities; however, little progress has been made in the area of coal leasing and development.

The Bureau of Land Management is in a position to recommend a course of action regarding coal leasing and development which would permit progress to be made. The implementation of a reasonable and rational coal leasing policy would result in the displacement of a significant quantity of imported crude oil and crude oil products and, thus, move our nation further down the road to energy self-sufficiency.

National interests are not the only interests which would benefit from a reasonable and rational coal leasing and development policy. The implementation of such a policy, now, would stimulate the job market, generate much needed revenues for federal, state and local government, and create competition among the various energy sources to the ultimate benefit of the consumer.

Bureau of Land Management
November 10, 1983
Page Two

In conclusion, you are urged to recommend a course of action that would facilitate the commencement of coal leasing and development activities in the San Juan River Region, now. Our nation, and its citizens, can ill-afford continued inactivity in the development of its coal resources.

Sincerely,

Tommy Roberts

Tommy Roberts
General Counsel

TR:nw

No substantive comments in letter #26.



U.S. Department of Housing and Urban Development
Denver Regional Area Office, Region VIII
Executive Tower
1405 Curtis Street
Denver, Colorado 80202

November 2, 1983

Mr. James Parker
Acting Director
Department of the Interior
Bureau of Land Management
Farmington, NM 97401

Dear Mr. Parker:

Thank you for the opportunity to review and comment on the Second Draft San Juan River Regional Coal Environmental Impact Statement (EIS).

Your draft has been reviewed with specific consideration for the areas of responsibility assigned to the U.S. Department of Housing and Urban Development. This review considered the proposal's compatibility with local and regional comprehensive planning and impacts on urbanized areas. One of the impacts you note is Social and Economic Factors, such as increased need for new housing of suitable quality and at an affordable price, limitation on new sewer or water hookups and a further decline in the availability of health care facilities. Mitigation of these concerns should be addressed in the Final EIS. With this exception, this EIS is adequate for our purposes.

27.1

If you have any questions regarding these comments, please contact Mr. Howard S. Kutzer of my staff, at (303) 837-3102.

Sincerely,

Robert J. Matuschek
Robert J. Matuschek
Director
Office of Community Planning
and Development, 8C

Responses to comment letter #27.

27.1

The communities that have been shown through analysis to be significantly impacted are discussed in the documents. These communities could plan to meet the facilities and services needs by working with State and Federal offices of EPA, HUD, FHA and other agencies which have funding authority. They could also work with companies, who will be developing local resources to provide these facilities. Also see the response to comment 21.2.

28

(Typed for Reproduction Purposes)

Mr. Bill Luscher
State Director
BLM
Box 1449
Santa Fe, New Mexico 87501

Dear Sir,

You've really done a sleazy job w/the DEIS comment period. Not only is it inconvenient, you have allowed too short a time for a fair and just amount of input. You are obviously afraid of that input, why? Also please try to show some humanity toward the Navajo.

/s/ Therese Patton

State Director
BLM
Caller Service 4104
Farmington, New Mexico 87499

Dear Sir,

The coal DEIS rerun is a sham. We oppose the unnecessary, unplanned and unlawful turnover of northwest New Mexico to energy developers and the run around the Navajos are getting!

/s/ Therese Patton

Mr. Luscher
State Director
BLM
Box 1449
Santa Fe, NM 87501

Dear Sir,

Concerning the DEIS comment period: Please extend the time limit and schedule more hearings. I protest the unnecessary, unplanned and unlawful turnover of N.W. New Mexico to energy developers.

Thank you,

/s/ Therese Patton

No substantive comments in letter #28.

29



United States
Department of
Agriculture

Soil
Conservation
Service

Room 3008 Federal Building
230 North First Avenue
Phoenix, Arizona 85025

November 10, 1983

Mr. Charles W. Luscher
State Director
Bureau of Land Management
Caller Service 4104
Farmington, New Mexico 87401

Dear Sir:

We have reviewed the Final San Juan Basin Cumulative Overview and Comment Letters and have no comments on the document.


Thank you for the opportunity to review this document.

Sincerely,

Acting For

Verne M. Bathurst
State Conservationist

No substantive comments in letter #29.

 Walton Hawk
Box 40
San Cristobal, NM 87564
Nov. 7, 1983

No substantive comments in letter # 80

State Director
Bureau of Land Management
Caller Service 4104,
Farmington, New Mexico 87401

Dear Director:

Personalley and as an Audubon Conservationist, I wish to comment on the Second Draft San Juan River Regional Coal Environmental Impact Statement October 1983 and the Final San Juan Basin Cumulative Overvlew and Comment Letters.

The more Environmental Impact Statements I look at, the less I appreciate their value. They are too much based on supposition about how a certain choice of action will affect the situation. They are too repetitious; so that I get lost trying to sort out the course of action that I feel will produce the most desired benefits. I have found inaccuracies in several of them, not in this one.

Since fair market value^{must} depend on the demand for a product as coal, and the coal market is depressed, I believe that all leases should be slowed up to correspond with current and immediate future demand. All governmental agencies will realize the maximum benefit from the coal if it is leased at a time of ~~high~~ market demand. Time lag between lease and mining is given as a reason to lease more coal now, but I am sure it can be speeded up when the coal is needed. The Chaco-Bisti area is a very unique and sensitive area; so the more important features must be protected from mining and its attendant damaging consequences. Important areas include the WSA's, the Fossil Forest, Chaco Historical Monument and most of its outlying sites. Since using the coal in the area will more than compound the environmental damage of mining it, all coal should be taken elsewhere for use, as in generating plants.

Sincerely:

Walter Hawk

31

UNITED STATES GOVERNMENT

memorandum

NOV 10 1983

DATE:

REPLY TO
ATTN OF: Navajo Area DirectorSUBJECT: Review - Second Draft San Juan River Regional Coal Environmental Impact
Statement - October 1983TO: State Director, Bureau of Land Management
Santa Fe, New Mexico

We have reviewed the subject document and our comments are basically the same as they were in our correspondence of May 25, 1983 (see attachments), with the following exceptions:

31.3

1. We are happy to see that BLM reformulated many of their proposed alternatives. We concur with this general attempt to reformulate the proposed alternatives. However, we don't believe this reformulation attempt went far enough, i.e., we believe all of the Indian Trust surface lands should be considered separately in the PRLA and Competitive Coal Leases alternatives. These Indian Trust lands should be dropped from leasing consideration until such a time as the effects of the proposed project on the Navajo people can be truly and fairly assessed and compensated. The present alternatives do not provide adequate compensation or mitigation for the anticipated effects on the Navajo Nation or individuals involved.

31.1

2. We concur with the dropping of the PRLA's from the "No Action Alternative." We believe that this was the correct decision and action on BLM's part. However, we believe it should be clearly noted in the EIS that we still have not applied unsuitability criteria to any of the Indian Trust lands in the PRLA tracts.

31.2

3. This second draft proposes the lowering of the coal leasing target from 1.2 - 1.5 billion tons of coal to 800-900 million tons. We generally concur with this attempt to lower the leasing target. Here again, we believe that BLM has not adequately addressed the impacts on Indian occupants of lowering the coal leasing targets.

31.6

4. The second draft also proposes changing the "Preferred Alternative" from the original "Target Alternative" to the "Minimum Surface Owner Conflicts Alternative". Again, we support this attempt to limit the impacts, but we still don't believe the BLM has adequately assessed or addressed the impacts on human resources. This "Minimum Surface Owner Conflicts" alternative still calls for the mining of 3.25 billion tons of in-place coal. This alternative will still affect 66,327 acres of land, 2,373 fossil localities, 18,950 acre feet of water per year, 9,466 animal units months (AUMs), 1,612 cultural sites, 62 Navajo families, 400-500 Navajo individuals living on the coal tracts and perhaps 22,000 Navajo individuals living in the general proposed project area. We believe this is still too high of a price to pay without adequate assessment of impacts on the Navajo families and individuals involved.

5. On page 1-20 the following statement is made:

2

"Unsuitability criteria ... have been applied to the PRLA's and competitive coal lease tracts ... in this EIS. The results of this application are found in Table 1-5. Also as a result of this application stipulations ... appear in Appendices 1-1 and 1-2."

In reviewing this second draft we find that the above statement is still not true with regard to "Indian Surface" lands in the following major items;

- A. The "Johnson Trading Post Tract" is the only tract that the BIA had enough information to find unsuitable under criteria #9-#15 (Wildlife), in any of the competitive coal lease tracts. This is because BLM was unable to furnish BIA with "adequate data or information" to apply the unsuitability criteria. BIA developed "stipulations" to be included in the mining leases so that provisions of the unsuitability criteria could be addressed.
- B. BIA has only applied unsuitability criteria #7 (Cultural Resources) to the competitive coal tracts. BIA has not applied criteria #7 to any of the PRLA tracts. Stipulations attached to the PRLA's have not been reviewed by BIA staff to assure promised changes in wording for compliance with the National Historic Preservation Act. Again, BIA developed "stipulations" to be included in the mining leases so that provisions of the unsuitability criteria could be addressed.
- C. Table 1-5 and Appendices 1-1 and 1-2 in the subject second draft does not include or reflect any of the BIA stipulations provided to BLM on September 27, 1983 (see attached correspondence), or discussed in several prior meetings between BLM and BIA staff.
- D. The entire sections on unsuitability criteria (pages 1-20 to 1-23), general stipulations (page 1-15), and Appendices 1-1 and 1-2 need to be completely rewritten to reflect a much more factual and up-to-date presentation of the situation with regard to BIA stipulations and application of unsuitability criteria. Also all of the BIA stipulations and rationale for application of unsuitability criteria, discussed between BIA and BLM staff on several occasions and provided to BLM on September 27, 1983, need to be included in this BLM document and reflected in all coal leases.

6. During the last meeting (August 3, 1983) between the BLM and BIA on this subject mining proposal it was agreed upon by BLM that the wording "consultation with BIA" on Indian surface lands, would be changed to "concurrence from BIA." This agreement is not reflected adequately in the second draft or in the proposed mining stipulations included in the text. This item needs to be corrected in the subject draft and in all mining stipulations for all coal leases.

7. On page 1-19 of the text the statement is made:

"One hundred percent surveys for black-footed ferrets will be done ..."

It should be pointed out very clearly in the text that with regard to these surveys on "Indian Surface" lands, these surveys will have to meet the requirements of the Navajo Area Director's policy of March 10, 1983 (copy attached). They will have to be "concurrent" in by both the BIA, Navajo Area Office (NAO) and the Navajo Fish and Wildlife Department. Also, all archeological surveys on "Indian Surface" will have to be "concurrent" in by BIA, NAO and by the Navajo Tribal Archeologist. These facts need to be made very clear in the EIS.

31.8

8. In view of the fact that according to this "second draft", the "No Action" alternative will supply approximately 800 million tons of in-place coal and the new leasing target is now 800-900 million tons of coal, we very seriously question the need for leasing any additional coal tracts at this time. We simply point out that the "No Action" alternative would, according to BLM's own information, probably meet the new coal targets and is probably the most logical and rational selection of alternatives at this time.

31.9

9. The discussion of effects on ground water supply in Chapter 3 indicates maximum annual withdrawals of about 18,950 acre-feet for the preferred alternative. Yet, the EIS makes no mention as to how existing users in the project area are to be compensated for these withdrawals. There is no discussion regarding a source of replacement water.

31.10

10. The description of the drawdown on existing aquifers fails to indicate in a clear fashion that the ground waters being used are, for all practical purposes being mined. The very low recharge rates in the San Juan Basin are mentioned nowhere in the EIS.

31.11

11. The section which treats mitigation measures in Chapter 3 includes no discussion as to how the individual lessees are to be compensated for the massive effects on the regional ground water supply in the project area. Merely to cite the existence of the State Engineer's review authority over ground water, in no way satisfies BLM's responsibility to describe explicitly the mitigation measures necessary to offset the projected effects on water supplies.

31.12

12. The EIS makes no mention of the pending claims of the Jicarilla, Ute Mountain, and Navajo Tribes to the ground water of the San Juan Basin, and how such claims will affect availability of water for non-Indian initiated energy projects.

31.13

13. There should be a table in the EIS which indicates the surface acreage directly affected by each proposed lease tract. This table should also indicate the surface and subsurface ownership and land status for each of these tracts. The total amount of surface to be ultimately disturbed for each tract and the land status type or types involved in each alternative should also be clearly indicated in this table.

Thank you for the opportunity to review the second draft and we hope these comments can be of assistance to you.



cc: Chairman, Navajo Tribe
Louise Linkin, EPA Navajo Tribe
John Antonio, Navajo Tribe Fish and Wildlife
Mahesh Takur, Navajo Energy Development Authority
Director, Navajo Coal Commission
Superintendent, ENA

Responses to comment letter #31.

31.1 The Minimum Surface Owner Conflict (MSOC) Alternative was developed to present a leasing level that would result in the least impact to residents. Under this alternative, no one would be required to move due to mining operations. Significant impacts are not expected to occur to residents located within the tracts under this alternative. This alternative appears to be the most favorable for residents living in the San Juan Basin. Because of this alternative and the resulting analysis, it is felt that the impacts have been adequately identified and analyzed for the Navajo people.

31.2 Unsuitability has been applied by BLM on the PRLA tracts. The text (page 1-20) has been revised.

31.3 The unsuitability criteria has been applied and accepted by the BIA on all competitive tracts and PRLAs. Stipulations have been included in this document on all tracts to insure protection of the species of concern in Criteria 9-15.

31.4 Unsuitability No. 7 has been applied by BLM on all the PRLA and by BLM and BIA on the competitive tracts. BIA will have representatives on the team which develops the actual lease stipulations to insure compliance with the National Historic Preservation Act and to insure that other concerns are met.

31.5 The BIA and BLM will develop the stipulations that will be attached to the leases when they are prepared for lease sale.

31.6 The text has been revised. Also see the response to comment 31.5.

31.7 A stipulation has been added to the Additional Mitigating Measures (in the EIS) to give BIA concurrence authority.

31.8 The text has been revised; refer to the Additional Mitigating Measures. The BLM and BIA will develop the stipulations that will be applied to each lease.

31.9 See the response to comment 11.4.

31.10 See the response to comment 1.2

31.11 See the response to comment 11.4. Specific water mitigation measures cannot be developed until specific mine plans are available.

31.12 Since these claims have not been resolved, and it is not possible to predict their outcome, it is not known how they will affect availability of water for non-Indian uses. Also see the response to comment 1.2.

31.13 Visual A in the first draft showed the tract surface and mineral estate ownership. The tract-specific summaries contain the total acreage, the surface and subsurface ownership and acreage, and the surface land status and acreage. We believe this information is adequate to make an informed decision.



National Parks & Conservation Association

1701 Eighteenth Street, N.W., Washington, D.C. 20009

RUSSELL D. BUTCHER
Regional Representative
SOUTHWEST
Box 67
Cottonwood, AZ 86326
(602) 634-5758

(202) 265-2717

November 14, 1983

State Director
Bureau of Land Management
Caller Service 4104
Farmington, New Mexico 87401

Dear Sir:

National Parks & Conservation Association is especially concerned for the long-term welfare of Chaco Culture National Historical Park; certain of the Chacoan Outlier units; the Bureau of Land Management's Bisti, De-na-zin, and Ab-shi-sle-pah Wilderness Study Areas (WSAs); and the "Fossil Forest." The irreplaceable paleontological, archaeological, wilderness, and scenic values of these places deserve the utmost protection for their educational, scientific, recreational, and inspirational values.

Regarding...

EXISTING COAL LEASES:

We strongly favor the Congressionally authorized exchanges: NM-0186613 (which partly underlies and is partly adjacent to the Bisti WSA) and the northern part of NM-0186612 (adjacent to the Bisti WSA), because coal strip mining of these tracts would seriously impair and/or destroy the natural values of this unique badlands area.

We urge a similar exchange: NM-0186615 (adjoining the southern edge of the Bisti WSA) and the southern part of NM-0186612. As the "Second Draft: San Juan River Regional Coal Environmental Impact Statement, October 1983" states (pages 3-18 & 19): "The sights and sounds associated with surface mining of these leases could disrupt the wilderness characteristics of naturalness and opportunities for solitude in this WSA. Objectionable sounds could include sirens and noises from blasting, operation of equipment, and transportation. Visual effects could result from the viewing of mining structures and operations from within the WSA, lighting of the sky during night

2-November 14, 1983
NPCA re Second Draft San Juan Coal EIS

operation, and decreased visibility due to the dust produced by mining." This statement from your document says it all, and argues compellingly for adequately protecting the Bisti badlands from these kinds of major industrial impacts.

NONCOMPETITIVE COAL LEASING (Preference Right Lease Applications (PRLAs)):

Given both the great quantity of already leased federal coal in the western states and the lack of market demand, we join with many other groups, individuals, and members of the Congress in seriously questioning the need to issue these noncompetitive coal leases. However, should there actually be a clearly demonstrable need, we would then urge exchanging out the following PRLAs to environmentally less sensitive areas:

(1) A block of PRLAs lying north of and within a mile or two of Chaco Culture National Historical Park and also lying beneath and adjacent to the BLM's paleontologically valuable and scenic Ab-shi-sle-pah WSA: NM-2918, NM-3919, NM-6804, NM-9764, and NM-8745. Not only would coal mining within these PRLAs destroy and/or impair the natural badlands ecology of this wilderness study unit. Surface mining, particularly within the southern part of this block of tracts, could greatly impair the visitor's experience within Chaco Culture National Historical Park. As the "Second Draft" states (page 3-37): "Surface mining on PRLAs NM-3918, NM-3919, NM-8745, and NM-9764 could cause visual and noise distractions to visitors at major recreation areas in the EIS Region, including the Chaco Culture National Historical Park, and especially the popular Pueblo Alto site." Again, your document says it all, arguing most persuasively against allowing mining within the site and sound of the national park and other major recreation areas.

In addition, the "Second Draft" points out that "The [mining-related] increased traffic flow and rerouting of State Highway 57 could interrupt visitation to the Chaco Culture National Historical Park." This highway is, in fact, the vital access road to the national park from the north.

(2) Three PRLAs beneath and adjacent to the BLM's De-na-zin WSA: NM-3834, NM-3838, and NM-6801 (the latter is also adjacent to the Bisti WSA. As previously quoted from your document, major coal mining activities immediately adjacent to a wilderness unit can seriously impair and disrupt the visitor's enjoyment of wilderness values and naturalness. Such large-scale industrial activities, being totally incompatible with wilderness and park-type values, should therefore not be permitted in areas adjacent to the wilderness units.

3-November 14, 1983

NPCA re Second Draft San Juan Coal EIS

(3) One PRLA beneath and adjacent to the BLM's Bisti WSA: NM-11916.

(4) Two PRLAs that include parts of the paleontologically important "Fossil Forest": NM-3752 and NM-3753. We strongly favor your proposed "mitigation" measure described on page 3-86: "No surface coal mining will be allowed within the boundaries of the Fossil Forest." However, we urge this area be permanently protected from industrial development; not merely given a ten-year grace period.

COMPETITIVE COAL LEASING:

We join with many others in questioning and challenging the alleged need for additional coal leasing in the San Juan Basin. However, should there be a clearly demonstrable need for even more leased federal coal in the region, we mostly favor the "Minimum Surface Owner Conflicts" alternative, preferred last April by the Regional Coal Team. This alternative emphasizes proposed underground mine sites and surface mines in what are believed to be generally less environmentally sensitive areas such as the Lee Ranch. We are particularly in favor of this alternative's exclusion of the highly sensitive Bisti group of competitive coal lease tracts (Bisti 2, 6, 8, and 4, especially; but also Bisti 1). By your document's admission, mining of these tracts would seriously impair adjacent wilderness study areas, and would also destroy outstanding paleontological, geological, and scenic values within the tracts themselves. Bisti 4 includes a major part of the "Fossil Forest" which deserves protection of its potentially outstanding paleontological assets.

Speaking of the Lee Ranch, located some thirty to forty miles south of Chaco Canyon and the Bisti area, National Parks & Conservation Association continues to urge the "McKinley County Exchange" on the basis that the Lee Ranch area is a more appropriate part of the San Juan Basin in which to block up coal development interests (in this case, fee coal) than is the environmentally sensitive area around the BLM badlands and Chaco Canyon; and that the Lee Ranch is much closer to major transportation lines than is the Chaco-Bisti area. Our bottom line, in fact, is to urge your agency to make similar exchanges (of coal leasing interests) out of highly sensitive areas where there are major values in paleontological, archaeological, geological, scenic, and wilderness resources; and block up the coal leasing interests in less sensitive places, such as the Lee Ranch.

Several other points: Ecologists and soils experts are still raising serious doubts as to the likelihood of re-vegetating some of the more fragile parts of the San Juan Basin's high desert terrain--notably the naturally occurring badlands.

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NPCA re Second Draft San Juan Coal EIS

This latter problem is not even mentioned in the "Second Draft," and we urge that mining impacts and restoration of badlands terrain should be thoroughly discussed and analyzed.

We are also concerned that a thorough investigation of whether in fact there is sufficient water available to sustain major coal mining operations in the San Juan Basin seems lacking. Just what limits may there be to coal mining, as set by water limits?

We believe that a single weekday public hearing (Farmington, Nov. 8, 1983) has not afforded interested groups and individuals an adequate chance to express their views on the "Second Draft." We urge hearings also be held in Gallup, Albuquerque, and Santa Fe. We also urge that the 45-day public response period for the "Second Draft" be doubled.

In summary, National Parks & Conservation Association strongly urges that every conceivable effort be made to realistically protect and preserve the nationally outstanding archaeological, paleontological, wilderness, scenic, and other irreplaceable values of the Chaco Canyon-Bisti-De-na-zin-Ah-shi-she-pah-Fossil Forest area. Chaco Canyon itself is undeniably the "Grand Canyon of America's national cultural parks." The four BLM badlands areas are of such outstanding paleontological value that some experts are even urging they deserve addition to the National Park System--a proposal we would support with enthusiasm.

We urge that America is not so poor in available coal resources, nor so rich in protected archaeological, paleontological, geological, wilderness-recreational values that it is compelled to sacrifice the latter for the former, any more than America needs to exploit Yosemite, Yellowstone, or the Grand Canyon for its mineral wealth they may contain. Before it is too late, we hope that the unique and irreplaceable cultural, scientific, and scenic treasures of the Chaco-Bisti area can be given adequate protection for the enjoyment and education of all future generations. If these great assets are impaired or destroyed, man can never restore them. They'll be lost forever.

Respectfully yours,

Russell D. Butcher

Russell D. Butcher
Southwest Regional Representative
National Parks & Conservation Ass'n
Box 67
Cottonwood, AZ 86326

Responses to comment letter #32.

- 32.1 Initial establishment of vegetation has occurred at active surface mines (McKinley, Navajo, San Juan and De-na-zin) in the San Juan Basin. Long-term studies are not yet available on plant density, diversity, composition, and reproduction under grazing pressure. An excellent overview of reclamation research and application is presented in "Reclamation of Mined Lands in the Southwest, a Symposium", Earl F. Aldon and Oaks, Wendall R., ed., 1982, published by SCSA - New Mexico Chapter. Re-creation of badlands terrain is generally not attempted because the steep slopes alone tend to defeat reclamation efforts. The analysis for each mine and its impacts, including proposed reclamation topography, is developed in the mine plan and reclamation document. This document must be approved by OSM and the State of New Mexico before mining can proceed.
- 32.2 A determination of water availability is the responsibility of the New Mexico State Engineer and is handled on a case-by-case basis. He has the authority to modify or disapprove water right applications, which may indirectly limit or modify coal mining. Also see the response to comment 12.1.
- 32.3 See the response to comment 9.4.

33

Roland A. Goodman
Route 9, Box 91-F
Santa Fe, N.M. 87501

State Director
Bureau of Land Management
Caller Service 4104
Farmington, New Mexico 87401

Dear Sir:

After plowing through much of the second draft of the San Juan coal EIS, and scanning the final San Juan Basin cumulative overview, I must admit to dismay and disappointment. The illiteracy of the coal EIS was a handicap -- it was full of errors in spelling and grammar, and some sentences and paragraphs were so mixed up as to be incomprehensible.

The greatest dismay is over your near-dismissal of the basic question: Who'll buy all that coal? You virtually dismiss this with an evasive point 4 on page 4-3 (and it's impossible to find any coal-market comment in Chapter 3, as promised in that paragraph). You go into infinite and repetitive detail on numerous other points -- but all that is meaningless if no one will want to buy the newly leased coal in the visible future. Clearly, you are evading your responsibility on this point.

Beyond that, the massive second draft reminds me of the old remark about having a diarrhea of words and a constipation of ideas. Examples:

You discuss the water situation at infinite length, with much geological language and diagramming. But you avoid stating the obvious conclusion that there is very little water, and it's already spoken for, making mining impossible (so a lease sale would be a charade).

You still lack adequate inventories of cultural and paleontological sites. But you admit that many of these would be destroyed by mining -- and suggest that this is unavoidable and acceptable. If you don't know what's there, how can you know how valuable it is? You suggest that mining companies would be required to care for such sites -- but the admission that the sites will be destroyed shows that you don't expect the miners to obey your orders.

Your statement that there has been success in restoring some San Juan Basin land sounds more like a hope than a fact. Your own analysis of the soils in the proposed leasing areas makes it unlikely that the original condition could be re-created. If fact, you leave the impression of huge erosion to come in a new desert that will take the place of a semi-desert.

Your documents have convinced me that further mining in the San Juan Basin would be an economic, environmental and cultural disaster. If that is your intention, you have succeeded brilliantly.

Sincerely, *Roland A. Goodman*

Responses to comment letter #33.

33.1 See the responses to comments 8.1 and 8.4.

33.2 It is recognized that the need for adequate paleontological and cultural inventories still exist. However, adequate surveys have been conducted and are the basis of estimates of the quantity, quality and location of potentially significant fossil and cultural material.

Although the EIS acknowledges there will be unavoidable destruction of some fossil and cultural material, - nowhere is it suggested that this is acceptable. Detailed and site-specific inventories are planned and conducted at the mine planning stage.



UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE

Field Supervisor
Ecological Services, USFWS
Post Office Box 4487
Albuquerque, New Mexico 87196

November 14, 1983

Memorandum

To: Area Director, Bureau of Land Management, Farmington,
New Mexico

From: Field Supervisor, FWS, Ecological Services,
Albuquerque, New Mexico

Subject: Review of Second Draft San Juan River Regional Coal
Environmental Impact Statement, San Juan and
McKinley Counties, New Mexico (BLM)

This memorandum provides our review comments on the second draft Environmental Impact Statement (DEIS). On July 17, 1981, the Fish and Wildlife Service (FWS) provided comments on the draft Environmental Assessment for the Preference Rights Leasing Applications (PRLA). Scoping inputs on the subject EIS were provided on April 16, 1982. Review comments on the preliminary draft were provided August 13, 1982 and on the first draft EIS on April 6, 1983.

GENERAL COMMENTS

Threatened and Endangered Species

Section 7 consultation required by the Endangered Species Act of 1973 has been completed. The FWS issued a biological opinion on the proposed coal leasing on March 17, 1983. This biological opinion stated coal leasing would not jeopardize the continued existence of listed species.

1. The DEIS provides a copy of the biological opinion in Appendix D and makes reference to endangered species on pages 1-19, 1-20, 2-32, 3-18, 3-32, and 4-87. These discussions appear to adequately document the previous formal consultation process.
2. Page 1-19 indicates that stipulations for threatened and endangered species surveys will be made for PRLA's and for new leases. Our review of Appendix I, Standard Coal Lease Form and Additional Special Stipulations,

34.1

2

shows these stipulations for Endangered Species compliance are not included. If these stipulations are not included, Section 7 consultation will have to be reinstated on the BLM's coal leasing action. In this regard the FWS recommends that Appendix I and PRLA and new leases incorporate the following language as a stipulation:

Prior to implementing surface disturbance activities, the lessee will conduct site-specific surveys for Federal listed threatened or endangered species. If these species are located, the lessee will consult through the Federal surface management or permitting agency with the U.S. Fish and Wildlife Service in order to make a determination of affect and comply with Section 7 of the Endangered Species Act. If formal Section 7 consultation is initiated, the Federal agency and the permit or license applicant shall not make any irreversible or irretrievable commitment of resources with respect to the agency action which has the effect of foreclosing the formulation or implementation of any reasonable and prudent alternative measures which would avoid jeopardizing the continued existence of any endangered or threatened species or adversely modifying or destroying the critical habitat of such species. Section 7 consultation may advise surface management or permitting agencies to alter lease boundaries, preclude surface mining, or change mining practices.

Unsuitability Criteria Numbers 9, 11, 12, 13 and 14

The FWS has cooperated with BLM in applying appropriate unsuitability criteria. These activities are documented on pages 1-20- through 1-23. Discussion on page 1-20 regarding criteria 9, 12 and 13 should be clarified by indicating the applications of criterion include proposals to incorporate stipulations for appropriate surveys in leases. Also, the statement regarding criterion 13 is incorrect; Table 1-15, page 1-21 and discussion on page 1-23 indicate a prairie falcon nest exists in PRLA number NM 3834.

34.2

Aquatic Habitats

Surface waters in the lease areas are discussed in the EIS. Intermittent streams, stock ponds and reservoirs are important seasonal habitat for a large variety of wildlife. Water for wildlife in the San Juan Coal Region is scarce. Impacts to intermittent and permanent waters and associated habitats should be discussed in the EIS. Mitigation and reclamation of these habitats with mine developments should be presented in the EIS. This comment has been presented in scoping, preliminary

34.3

draft and first draft inputs with no evidence that the concern has been addressed or considered.

Fishing and Hunting Recreation

The draft EIS indicates dispersed hunting and fishing will be influenced through habitat destruction and through increased population and demand for recreation. Additionally, increased human populations and consequent social and economic developments will reduce wildlife habitats in and around cities. This is particularly significant due to increased recreation demand as projected in the San Juan Cumulative Overview Document. Wildlife habitat reclamation and adequate post-mining management of vegetation and wildlife habitat will enhance long-term productivity of public lands and provide wildlife resources for recreation use.

Mitigation

The FWS endorses the mitigation measures presented on Pages 3-84. Additional fish and wildlife mitigation measures that should be considered include the following

1. Fences at coal mine reclamation areas should be retained to enable BLM managers to properly manage post-mining grazing and maintain quality wildlife habitat.
2. Siltation ponds to prevent erosion and enhance wildlife habitat at coal mines should be encouraged. Ponds should be maintained to improve livestock and wildlife values following abandonment of the mines.
3. Hunting on all coal leases should be regulated. Access by off-duty mine employees or others should be controlled.
4. Emphasis should be placed on creation or replacement of wildlife habitat features such as rock piles, cliffs, raptor nesting and perching sites, riparian vegetation and water areas. Plans for these features can be considered during mine plan development and review.
5. Mine employees should be provided company transportation from area cities to mines to reduce wildlife road kills and illegal shooting of wildlife. In addition, providing transportation would reduce the need for local housing developments and associated secondary impacts to wildlife.

34.4

6. The cumulative impacts of hunting and fishing activities due to human population growth are projected for the San Juan Region. Plans should be formulated by BLM and other agencies to prevent potential overuse in areas such as the San Juan River high quality fishing waters. Recreation management plans should be developed by managing agencies.

7. During mine planning and development stages FWS biologists will continue to cooperate with land managing agencies and the coal industry in developing adequate wildlife mitigation and enhancement measures.

SPECIFIC COMMENTS

Surface Mine Reclamation, Page 1-23 through 25. The FWS will continue to offer assistance to BLM, USM, BIA and the coal industry during mine planning stages to develop wildlife reclamation measures and to insure compliance with wildlife related laws and regulations.

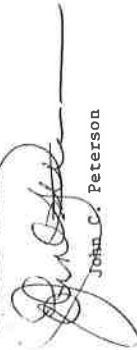
Assumptions and Analysis Guidelines, Page 3-2. We commend BLM for including wildlife as a post-mining land use (see specific comment Surface Mine Reclamation, Page 1-23 through 1-25).

Impacts, Target Alternative, Wildlife, Page 3-95 and High Alternative, Wildlife, Page 3-96. Big game (deer) habitats may be affected by coal mining in the Twin Buttes, Pinehaven and Bread Springs Tracts. These habitats should be considered in the discussion of wildlife impacts.

34.5

SUMMARY COMMENTS

The opportunity to provide comments on the second draft EIS is appreciated. With incorporation of our general and specific comments, the EIS will adequately consider fish and wildlife resources. The FWS urges continued close coordination in coal mine planning. Adequate implementation of fish and wildlife measures and post-mining management of vegetation and wildlife resources will minimize the effects of coal development in the San Juan River Coal Region on fish and wildlife resources.



John C. Peterson

cc:
Director, New Mexico Department of Game and Fish, Santa Fe, New Mexico
Regional Director, FWS, HR, SE, Albuquerque, New Mexico

Responses to comment letter #34.

- 34.1 Committed mitigation on pages 1-16 through 1-20 will become lease stipulations for all competitive and PRLA leases. The mitigation measures have also been revised.
- 34.2 The text has been revised.
- 34.3 The text has been revised to include mitigation measures per your request. We recognize that some stock ponds or reservoirs could be destroyed during mining which would eliminate some aquatic habitat but it is felt that the impacts to wildlife diversity or population would be minimal. The text mentions that all wildlife species and their habitats were analyzed and the regional impact to these species were not determined to be major enough to include in the EIS document.
- 34.4 The text has been revised to reflect additional mitigation measures. All of the mitigation measures have been considered. Those that have not been used are more appropriate for consideration and analysis at the mine plan stage.
- It is standard procedure for the FLM to develop wildlife and recreation activity plans to manage increased use on these resources. Activity plans will be developed to manage use pressures from mining activities when a need is recognized.
- Consultation with the FWS will continue to occur to ensure that adequate stipulations are developed for both the coal lease and the mining permit.
- 34.5 Deer habitat may be affected by coal mining in the Twin Buttes, Pinehaven and Bread Springs tracts. However, the game maps -- New Mexico Department of Game and Fish Comprehensive Plan do not indicate that the tracts contain "critical habitat" but that critical habitat is adjacent to these tracts.

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Judy Stolz
801 E. 24th St.
Farmington, NM 87401

November 17, 1983

State Director
Bureau of Land Management
Caller Service 4104
Farmington, NM 87401

Dear Sir:

In order to preserve the archeological and cultural heritage of the San Juan Basin, it will be necessary to strictly limit the coal leasing and mining plans. It will be necessary to designate as national wilderness areas all four study areas - Bisti, De-na-zin, Ah-shi-sle-pah, and the Fossil Forest area.

There are many legitimate reasons why there should be no great amount of coal mining in the San Juan Basin. I will leave it to the experts to describe the evidence that they are familiar with. My expertise lies with PEOPLE. And it is people, specifically Navajo Indians, who will suffer if this area is mined, developed and desecrated. These 25, 50, or 100 families that would have to be "relocated", are not typical Americans, who can be induced to leave their homes for a better job, a better lifestyle. Most of these Navajo families have lived in the same place for generations. Their land is an integral part of their identity, and especially their religion. This land of theirs holds religious significance that is beyond the ordinary man's comprehension. There is no greater loss that they could suffer, than the loss of their land.

I understand that this relocation issue is not a priority - it should be. The second DEIS has inadequate studies and evidence in so many areas, that I think we need more time. And I can't help but be concerned about the Navajos in the affected areas. If we force them to leave their land, well, we might as well just shoot them in the back.

Sincerely,



cc: file

No substantive comments in letter #35.

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November 18, 1983

Charles W. Luscher
State Director
Bureau of Land Management
Santa Fe, New Mexico

Re: Second Draft, San Juan River Regional Coal Environmental
Impact Statement

Dear Mr. Luscher:

The following are my written comments on the second DEIA. Thank you for the opportunity to submit them.

(1) The DEIS contains no meaningful analysis of the need for more coal leasing in the San Juan Basin. On page 1-1 the question of need is dismissed with the statement that such need was "established and documented" in the FEIS for the Federal Coal Management Program and in Department of Energy Production goals. The FEIS was published in 1979; the DOE production goals are based on four-year-old information submitted by coal industry and electric utility representatives. This outdated information was overly optimistic when it was submitted and is even more so today. If the BLM continues to rely on it to demonstrate a "need" for more leasing, it will be making an error which will have drastic consequences for the inhabitants of the San Juan Basin as well as the physical environment. In addition, it will be breaking the law. An adequate analysis of the social need for leasing is essential to the BLM's ability to make a meaningful choice between adopting the proposed leasing target and adopting alternatives such as staggered leasing, postponed leasing, or a lower leasing target. An EIS cannot merely list alternatives; it must clearly state the reasons for a particular choice of action. See, e.g., *EDF v. Froehke*, 473 F.2d 346. Such a clear statement is not possible where the need for the project is assumed instead of examined.

The DEIS's failure to consider the question of need is even more egregious where recent accurate information is available. The New Mexico Energy Research and Development Institute published, this year, a comprehensive forecast of expected demand for New Mexico coal. It would not have taken much effort to analyze the forecast and compare it to the DOE study. The lack of even such a minimal demand and need study is unacceptable.

(2) The DEIS does not meet the requirements of Sierra Club vs. Kleppe, 427 U.S. 390. The Cumulative Overview does not do so either. The cumulative and synergistic impacts of all development under the San Juan Basin Action Plan must be studied. The DEIS does not even

Charles W. Luscher
Letter - November 18, 1983
Page 2:

36.1 study the synergistic impacts of coal leasing alone. On page 3-3 the DEIS assumes that leasing or production from one tract or cluster of tracts would have no effect on impacts from another tract. Instead of assuming that fact the DEIS should analyze it. Even a cursory analysis would show that it is false. All of the proposed leasing will take place in the same general area. Common sense indicates that if two tracts are developed the impacts on the Navajo population and the environment will be greater than the effects of each development would have been. Developments do have synergistic effects on each other; if twice as many outsiders move into the San Juan Basin the incidence of, for example, alcoholism and mental stress will increase more than two-fold. In any event this question should be studied, not assumed away.

In addition, no document analyzes the synergistic impacts of all the proposed actions. No study shows how much less coal will be mined if NMGS is not built, or how many additional sacred sites or gravesites will be destroyed by increased coal mining if it is built. Each development is treated separately and then the worst-case figures are simply added together. That is not an adequate treatment of the cumulative and synergistic impacts of all federal actions in the San Juan Basin.

(3) The DEIS indicates that little or no effort will be made to assure access to sacred sites and to preserve gravesites in situ. The DEIS states that neither unsuitability criteria nor AIRFA protects sacred sites (p.4-135). This statement is wrong, as a look at a few AIRFA cases shows. See Northwest Indian Cemetery Protective Association vs. Peterson, U.S. Dist. Ct. for Northern District of California, No. C-82-4049 SAW; Wilson v. Block, D.C. Court of Appeals. These cases show that AIRFA and the First Amendment do afford some level of protection to sacred sites.

(4) The DEIS states, on p. 4-132, that the BLM's authority to specify or require Navajo preference is unclear. However, on p.1-6 the DEIS states that the Department of the Interior "has full discretion to include lease forms required to protect the public interests." The contradiction is clear. In fact the Mineral Leasing Act of 1920, 30 U.S.C. §201 et seq., gives the Secretary the discretion to impose lease terms which are in the public interest. This seems to give the BLM clear authority to require Navajo preference, if that would be in the public interest. I think it is clear that it would be.

(5) The DEIS vastly overestimates the precipitation in the area, ignoring its own statistics to do so. On p.2-1 the DEIS says the average precipitation in the EIS region is 10-14 inches per year. On p. 4-54, however, the DEIS lists precipitation levels for the 1979-1980 "precipitation year" at 8 test sites. The 8 readings are: 7.86 inches; 7.15 inches; 6.74 inches; 9.53 inches; 6.91 inches; 11 inches; 9.25 inches; and 11.08 inches. Either the statement on p. 2-1 is

36.2

36.3

Charles W. Luschet
Letter - November 18, 1983
Page 3:

wrong or the figures on p. 4054 are incorrect. An explanation is needed.

36.4 (6) The first paragraph on p. 3-34 says increased scientific knowledge about past cultures in the PRLA area would be produced after the PRLAs are issued. The second paragraph, however, contradicts this by describing the lack of time and money which afflicts pre-mining studies. Which is correct?

36.5 (7) P. 2-44 discusses the possibility of moving the corridor of the Continental Divide Trail to the east, to avoid conflicts with the proposed leasing. There is no discussion of the legality of such a move or whether Congressional action would be necessary to accomplish it.

36.6 (8) P. 2-36 says that the BLM Chacoan Roads study "has basically mitigated the impacts of surface coal mining on the known Chacoan roads." How does a study make up for the destruction of a one-of-a-kind architectural treasure? This destruction would certainly violate the National Historic Preservation Act.

36.7 (9) On p. 3-99 a sentence seems to be missing.

36.8 (10) P. 2-57 states that demand for grazing use areas within the EIS region exceeds the available permits. The BLM still, however, insists that the "unauthorized occupants" and allottees can be relocated to other grazing areas in the region. It will be impossible to do that. A more honest appraisal of the effects of relocation on the residents must be included in the EIS; the BLM should not continue to try to minimize the impacts by suggesting that mitigation measures proposed to date are feasible.

36.9 (11) One impact which has not been discussed at all is the increased burden on the tribal court and state court systems which the influx of outsiders and development will produce. Livestock kill disputes, trespass claims, divorces, and other civil as well as criminal matters will swell the courts' dockets. A possible mitigative measure would be the establishment of a mediation system or some other informal dispute resolution system.

Sincerely,

Paul Fyfe
Paul Fyfe
Attorney

PF:erj

Responses to comment letter #36.

36.0 See the responses to comment 8.4.

36.1 See the response to comment 8.1.

36.2 See the responses to comments 23.2 and 57.28.

36.3 See the response to comment 9.8.

36.4 The information contained in paragraph 2 page 3-34 has been modified to be consistent with the concept of increased scientific knowledge presented in the first paragraph. Although time frames may be tight, mitigation of impacts to cultural resources will take place because of Federal requirements.

36.5 To date the Continental Divide National Scenic Trail (CDNST) does not exist as a treadway located on the ground. At a July 1981 meeting the CDNST Advisory Council recommended that a "zone of concern" be established 50 miles either side of the hydrographic divide. The purpose of this "zone" would be to enable the management agencies to consider the greatest number of trail location alternatives, that meet the location criteria, in making the initial decision on actual trail location. Such a zone, if established, would also allow for future relocation of the trail within this "zone" and without additional Congressional action.

It has been recommended that the Draft Comprehensive Plan for the CDNST be revised to reflect the concerns of mineral development and land ownership conflicts within the recommended "zone of concern" as it crosses the San Juan Basin. The New Mexico Bureau of Land Management and Region III of the Forest Service have jointly recommended to the Forest Service Region II, Regional Forester, Chairman of the Advisory Council that alternative trail locations be considered outside the 50 mile "zone of concern" eastern boundary.

The purpose of this "zone" was to define the area in which the Secretaries of Agriculture and Interior, in consultation with agency heads, may locate the segments of the CDNST system in accordance with the established location criteria without being considered a substantial relocation requiring an Act of Congress (16 USC 1246(b)). The establishment of the "zone of concern" was for definition purposes. However, the Plan which has defined this "zone" has neither been finalized nor accepted by Congress.

36.6 The Chacoan Road segments that have been studied are basically mitigated. Once a study has been completed and no further information is to be gained and there are no other remnants or associated structures, then their preservation is no longer required. The study also allows for formulation of avoidance type mitigative measures if it's determined necessary for unique sections of the Chacoan Road segments. Road segments that have not been studied previously, will be part of a mitigation plan when new segments are located.

36.7 There was insufficient information in this comment to adequately respond.

36.8 See the discussion "Navajo Relocation" at the beginning of Chapter 4. Obviously, it will be necessary to reevaluate or negotiate with other allottees to determine if or where grazing lands will be available in the region. If so, that will be the priority for relocation. If not, then relocation settlement will be negotiated similarly to the recommended mitigation on pages 3-90 through 3-92. Exact details cannot be finalized until it is known who, when and where relocation is necessary.

36.9 Incidents that might come before the courts have increased at a faster rate than population in other energy impacted areas. This would probably be true for the San Juan Basin, the Cuba area, and perhaps the Crownpoint-Thoburn area. Under the High Alternative, these are the areas where impacts related to courts might reach significant levels.

The mediation system has some support now as an alternative to Courts and certainly could be considered by the local communities.



Arnel Adams

SIERRA CLUB LEGAL DEFENSE FUND, INC.

Symes Building 820 16th St., Suite 514 Denver, Colorado 80202 (303) 892-6301

November 18, 1983

Charles Luscher
State Director
Bureau of Land Management
Caller Service 4104
Farmington, New Mexico 87401

Dear Mr. Luscher:

The Sierra Club Legal Defense Fund has reviewed the Second Draft of the San Juan River Regional Coal Environmental Impact Statement (EIS) on behalf of the Sierra Club, the Natural Resources Defense Council (NRDC) and other environmental and citizen groups, and consulted with these groups in the preparation of their comments. The comments submitted by NRDC, the Committee on Coal, the Environmental Defense Fund, the Crown Point Citizens' Alliance and the Sierra Club represent and include our views on the EIS. We see no need to duplicate these comments. As they make clear, the Second Draft of the San Juan Regional Coal EIS is not a substantial improvement over the First Draft.

Sincerely,

Karin P. Sheldon

Karin P. Sheldon
Rocky Mountain Office

KPS/rs

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No substantive comments in letter #37.

38

39

RR 2, Box 257-C
Aztec, NM 87410

November 18, 1983

DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Centers for Disease Control
Atlanta GA 30333

November 16, 1983

Mr. Charles W. Luscher
Bureau of Land Management
Caller Service 4104
Farmington, NM 87401

State Director
Bureau of Land Management
Caller Service 4104
Farmington, New Mexico 87401

Dear Sir:

Thank you for sending us a copy of the Final San Juan Basin Cumulative Overview (CO) and Comment Letters. We understand that this CO document is not an EIS but is incorporated by reference in each of the individual site-specific EIS's. These statements include the New Mexico Generating Station, San Juan River Regional Coal Leasing, and the Wilderness Study Areas EIS's (Bisti, De-na-zin, and Ah-shi-sle-pah).

While we did not review the Draft Cumulative Overview, the U.S. Public Health Service and the Office of Policy Coordination of the Department of Health and Human Services (DHHS) commented on the Draft Environmental Impact Statement (EIS) for the New Mexico Generating Station and New Town (NMGS) and the Draft EIS for the San Juan River Coal Region, respectively. We note that our January 28 comments on the New Mexico Generating Station and DHHS's January 17 comments on the San Juan River Coal Region were included in the Final CO.

Since these comments have not been specifically addressed in the Final CO, we expect that each Final EIS will adequately address our public health concerns. We look forward to receiving a copy of the Final EIS for each of these projects when they become available. We appreciate the opportunity to provide post-Draft EIS consultation.

Sincerely yours,

Frank S. Lisella, Ph.D.
Chief, Environmental Affairs Group
Environmental Health Services Division
Center for Environmental Health

No substantive comments in letter #38.

Mr. Luscher:

A clear and concise cumulative overview is needed to summarize the six proposals for the San Juan Basin. Unfortunately, the Draft Cumulative Overview (CO), together with the proposed changes, is misleading.

It is evident, from comments in the Final CO, that a number of people were misled by the Draft CO. Comment 1 on page CO-24 is an example of how individuals expected a cumulative overview and were confused by the omission of such a basic resource as water. If you are interested in an overview that discusses only factors that have an interactive effect, then you cannot call it a cumulative overview. A cumulative overview must deal with all factors, whether they are just additive or have some form of interaction or exponential growth. Specifically, water must be treated additively, even though there are separate sources. A cumulative overview must have an estimate of the total acre feet of water required by the combined projects. This holds for all resources mentioned in the individual environmental statements.

If you are earnest in your intent to help decision makers, please consider the following changes.

Tables 1-1, 1-2, and 1-3 in the Draft CO are misleading. The use of the "-" sign is technically correct, but it gives the impression that the impact topic is not present under the designated topic. The "NS" is the most visible sign with the greatest impact, and yet, is the least important. To be helpful, these tables should be restructured so they appear together with one set of impact topics and all the projects across the top. Use the most attention getting signs to signify the most important information.

All the maps should be in miles or kilometers, and Map 2-1 makes Chaco CNHP look like a PRLA, and the WSAs are very hard to locate on the map. Use greater contrast.

With a careful review of the CO, you could eliminate even more of the confusing information, and you would have a more helpful document.

Regards,

Thomas Seamster

Thomas Seamster

No substantive comments in letter #39.

New Mexico Archeological Council
c/o Quivira Research Center
3017 Commercial NE
Albuquerque, NM 87107

New Mexico Archeological Council

2

November 17, 1983

Mr. Charles W. Luscher, State Director
Bureau of Land Management
Caller Service 4104
Farmington, New Mexico 87401

Dear Mr. Luscher:

Several members of New Mexico Archeological Council have reviewed the October 1983 version of the San Juan River Regional Coal DEIS. Their combined comments follow.

The cultural resource portions of the second DEIS are vastly improved over the first version. For example, we are pleased to note (pp. I-16, 17) BLM's commitment to Class III cultural resource inventory on all leases prior to surface disturbance and SHPO concurrence in National Register eligibility determinations. We would like to see a statement added to the stipulation in Sec. 31 of the standard lease form to indicate that "intensive field inventory" means 100% on-the-ground survey.

If cultural resources fare well in this version, however, American Indian concerns do not. We are at a loss to understand this, since NMAC and numerous other commentators were careful to detail inadequacies and to offer sources that would have helped remedy the deficiencies. Some remaining problems are:

1. Page I-18 (P's 2 and 4) states that "Ethnographic studies shall be completed [on]...sites protected under AIRFA, human burial sites, and any sites of particular historic value to the development of the cultural groups concerned." However, no stipulation to this effect is written into the standard lease form. The stipulation appears only for PRLA's (App. I-2).

2. Page I-19, Sacred Sites. This IP provides for notification to "allow an opportunity for mitigation of adverse effects on sacred sites." Further, p. I-35, P 4 states "These impacts could be minimized through ceremonies conducted by local medicine men." We would like to stress that for some sacred sites adverse effects cannot be mitigated. Provisions for avoidance need to be made for these sites. Again, the mitigation stipulation appears only for specific PRLA's (App. I-2, p. I-8), not in the standard lease form.

3. On p. 4-135, IP6, it is stated that "Sacred sites...are not to our knowledge afforded protection under...[the] American Indian Religious Freedom Act." This is incorrect. We refer BLM to a recent (May 24, 1983) legal decision, Northwest Indian Cemetery Protective Association, et al. v. U.S. Forest Service, which makes it clear that sacred sites can be protected under AIRFA.

40.5 On pp. 4-117 and 4-132, it is stated that "localized data on Navajo employment figures and skills are not available." In our comment on the first DEIS, we directed BLM's attention to a 1974 BYU study as a source of this information.

40.6 Relocation problems are addressed no more adequately in this version than in the first DEIS. Pages 4-136 and 139 state "Discussions of prior Navajo relocation would be general in nature and are not expected to provide any additional material on the types of impact expected to occur as a result of coal development." Numerous studies have been performed on specific impacts of involuntary relocation (e.g., Thayer Scudder, 1982, No Place to Go: Effects of Compulsory Relocation on Navajos, Philadelphia: Institute for the Study of Human Issues).

40.7 BLM does not know and has not investigated how many Navajo people live on the leases. There is no new information in this version.


40.8 The document does not show where Navajo grazing areas are. BLM has access to BIA grazing maps and determining grazing status should be no problem.

40.9 The maps in the document are inaccurate. They are based on BLM land status quads, which are known to contain many inaccuracies. Further, the document does not break down the various types on Indian ownership--information that, like grazing status, is related directly to eligibility to give surface owner consent. BLM is able to derive this information from its own realty books. Since ownership in this area is known to constitute the single most complex situation in the United States, it is critical that thorough and careful property analysis be performed.

40.10 The document gives no evidence that there are sufficient grazing lands for resettlement of displaced families within the same chapter. Obtaining such information is a critical prerequisite to resettlement.

We appreciate the opportunity to comment on this document.

Cordially,


Carol J. Condie
President

Responses to comment letter #40

40.10 See the response to comment 4.1.

40.1 All of the Committed Mitigation Measures, including the requirement for the complete cultural resources survey (Class III) and ethnographic survey will be included in the lease form as a stipulation. The BLM Manual (8100) states that a Class III inventory is:

Class III - intensive field inventory: an intensive field inventory designed to locate and record, from surface and exposed profile indications, all cultural resource sites within a specified area.

The text on page 1-16 of the Second DEIS has been changed to clarify what a Class III survey is.

40.2 See the response to comment 40.1.

40.3 See the response to comment 9.3.

40.4 See the response to comment 9.3.

40.5 See the response to comment 11.3.

40.6 See the discussion of Navajo Relocation at the beginning of Chapter 4, and the response to comment 11.3.

40.7 Appendices F-1, F-2, and F-3 list the number and location of Navajo occupancies on the FRLAs and the competitive lease tracts. This information is accurate, it was obtained from helicopter surveys and personal visits by BLM Navajo speaking individuals. Many residents were also visited by BIA and Tribal Officials.

40.8 The number of allottees, grazing areas, and number and type of livestock in the area is available for public review at the Farmington Resource Area Office. This information was not included in the EIS because the analysis was done on a regional basis.

40.9 The maps in both the first and second drafts were primarily designed to show surface ownership and status of the Federal coal estate. The colored map in the first draft was derived from the color quad maps and the Master Title Plats.

The surface and subsurface ownership on the tracts was derived solely from the Master Title Plats. The land ownership on each tract was checked twice for accuracy. Showing various types of Indian ownership would not be directly related to who would be qualified surface owners. A great deal more information is needed to actually determine qualified surface owners as specified in 43 CFR 3400.0-5 (99). The actual names of qualified surface owners have not been included in the EIS because BLM is in the process of making those determinations; that information can be reviewed in the BLM State Office in Santa Fe.

Kit Carson Memorial Foundation

...where heritage started and tradition lives.



November 17, 1983

State Director
Bureau of Land Management
Caller Service 4104
Farmington, New Mexico 87499

Dear Sir:

The Kit Carson Memorial Foundation takes this opportunity to comment on the San Juan River Regional Coal Environmental Impact Statement, Second Draft. The Foundation's comments focus on the adequacy of the DEIS in dealing with concerns in the areas of cultural resources and effects on Native Americans.

Cultural Resources.

General Comments. It is the opinion of the Foundation that the discussions of effects of coal leasing in the San Juan Basin on cultural resources are much improved from the first DEIS of last year. The major problem, as discussed below, lies in the eligibility of historic Navajo sites to the National Register of Historic Places. Other problems appear to be matters of consistency.

Chapter 1 - Description of the Alternatives.

Table 1-7, page 1-37. The predicted number of archaeological sites in PRLAs does not agree with the number presented on page xv. Which, if either, is correct?

41.1

Page 1-16. Regardless of whether BLM assumes "complete cultural resources survey (Class III)" to mean 100% survey (see page 4-19), BLM's policy statements should be consistent and explicit by specifying 100% survey. Further, this should be specified in the standard lease agreement.

41.3

Page 1-33. Are we to assume that BLM is either conducting or requiring conduction of systematic experiments on the effects of blasting on structures such as Chacoan pueblos and the Azabache Station Site?

41.8

State Director
Bureau of Land Management

41.8 Simple monitoring of effects (see page 1-17) may discover the effects too late.

Chapter 2 - Affected Environment.

Table 2-9, page 2-35. Why is there no data from the Star Lake West #2 or Catalpa Canyon tracts? Further, the number of sites assessed for National Register eligibility on PRLAs and the Divide tract do not agree with the total known sites.

41.4

41.6 Pages 2-36, 2-37 (Figure 2-9), 3-70. Is the name of this now famous site Pierre's Ruin, Pierre's Site, Pierre's Community, or Pierre's Ruin Community?

Chapter 3 - Environmental Consequences.

Page 3-34. The Foundation feels this is a good discussion of the problems involved in mitigating impacts on cultural resources sites. The discussion adequately addresses the issues of time-frame problems in mitigative archaeology (see page 1-37), the possible effects of blasting, and vandalism and pothunting. Unfortunately, specific mitigative measures for these mitigative problems are not addressed.

41.6

Appendix A-11.

Page A-84. The stipulation that the lessee will conduct an ethnographic survey (see page 1-18) should be added to the standard lease agreement.

41.7

Page A-83. The potential of a site for providing ethnographic or ethnohistoric data is not a criterion for National Register eligibility. On page 4-90, the DEIS states "Significance is determined through National Register eligibility." Following this, the DEIS quotes the four criteria for site evaluation. Most eligible sites are found to be so under Criteria d, which "addresses the informational values contained within a site and its associated environment..." (page 4-91). Neither the fourth criterion nor the first three exclude sites which may be interpreted ethnographically or ethnohistorically or limit potential information to that which is archaeologically obtainable. By deciding that post-World War II Navajo sites are ineligible because of their ethnographic or ethnohistoric potential, BLM is interpreting National Register criteria to include only archaeological sites. Further, BLM is declaring that only archaeological sites are significant, and thus should be accorded protection or mitigation. A conclusion of this nature appears to be beyond the delegated responsibility of BLM to make. Further, it indicates a very weak concept of historical archaeology and of the anthropological integration of ethnographic, ethnohistoric, and archaeological data. If the National Register were to adopt this criterion, it would be forced to purge itself of many important historical sites in our nation's capital, our state's capital, and even locations such as Taos Pueblo. This is personal professional bias at its worst. The Foundation is compelled to oppose the designation of post-World War II sites as ineligible for the National Register.

State Director
Bureau of Land Management
American Indian Concerns.

General Comments. Within this section, the Foundation wishes to address the issues of water, vegetation and grazing, social and economic factors, as well as those issues discussed in the DEIS under American Indian concerns. It is the opinion of the Foundation that the DEIS continues to minimize the impacts of further coal leasing on the Navajo residents of the San Juan Basin.

Water.

General Comments. While the DEIS discusses the increased need for water and potential decreases in quantity and quality and possible contaminations associated with mining activities, it does not discuss impacts on water supplies from 20 to 40 years of reclamation activities. Further, the sections on water resources do not discuss the effects of tremendous population increases in the areas surrounding the Basin. Where will water come from for the Gallup-Grants area, the Cuba area, and the Farmington-Aztec-Bloomfield area?

41.8

Chapter 2 - Affected Environment.

Page 2-57. Since about 90% of affected Navajo families must haul water to their residences, the EIS needs to address effects of the destruction of geological stratification which provides well water. Will these actions change access to water, including distance to wells and conflicts over water? Also, although the lessee is required to replace destroyed wells, the DEIS does not specify how long families can expect to have to wait before they can return to those wells.

41.9

Chapter 3 - Environmental Consequences.

Page 3-12. How will the destruction of surface water drainage patterns affect the availability of water to stock owners' downstream and off-lease?

41.10

Page 3-86. If irrigation water must meet certain specifications, and suitable water is not available, where will water be found for revegetation?

41.11

Vegetation and Grazing.

General Comments. The EIS should present a more detailed discussion of the concept of AUMs. The use of AUMs in calculating loss of grazing without an adequate discussion of the concept tends to minimize the effects of grazing losses. Page 2-32 states "the majority of operators are individual Navajo families who run small bands of sheep and goats." However, an AUM is defined as the "amount of forage required to sustain one cow or its equivalent for a period of one month" (page GL-1). One cow is the equivalent of five sheep or goats. Thus, for most of the local "operators" (what is an "operator"?), the loss of forage affects five times as many animals as the number of AUMs. For instance, the Minimum Surface Owner Conflict Alternative will result in loss of 4268 AUMs, or loss of forage for over 21,000 sheep or goats. This is a very sizable loss which must be born by an unspecified number of families. By not making the conversion from AUMs to actual number of affected animals, the DEIS minimizes the

41.12

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Bureau of Land Management

impact of grazing loss.

Summary.

Page viii. The DEIS states that loss of grazing privileges and AUMs will be compensated somewhat by fees paid for land use. However, the DEIS is not specific on how those fees will be structured. Are fees paid on a one-time basis or on a yearly inflating scale for the duration of the time the land is not grazable (20 to 40 years)? This issue is accorded very little discussion in the DEIS, and none of it is explicit or specific.

41.13

Chapter 1 - Description of the Alternatives.

Page 1-32. By saying that loss of vegetation and grazing privileges will be "short term" and "temporary," the DEIS minimizes the effects of grazing losses and emphasizes the orientation of the DEIS toward the benefit of BLM and the coal companies. For the latter two groups, 20 to 40 years may well be a short term. However, such is not true for those people who rely on that land for subsistence. For them, 20 to 40 years is anything but a temporary period of time.

Page 1-32. Can BLM be assured that "other areas for livestock grazing could be found"? On Page 2-57, the DEIS states that demand for grazing exceeds available permits at the present time and that conflicts over grazing are common. In light of this, BLM is responsible for determining whether or not alternative grazing areas will be made available. It appears, however, that BLM has taken the position that an accurate determination of grazing alternatives is not BLM's problem. Page 4-129 states that the lessee is "solely responsible for acquiring necessary forage or water for displaced herds..." What is the lessee's responsibility if no land or water is available? Will the lessee be forced to purchase hay, grain, and water for corralled stock for 20 to 40 years? If BLM is going to allow this situation to occur on lands in its jurisdiction, then these problems are BLM's responsibility as well as the lessee's.

41.14

Table 1-8, page 1-39. In Tables 1-7 and 3-4 and in the discussions of leasing alternatives, issuance of PRLA's is not included with the No Action Alternative. Why are the two combined in Table 1-8? Further, the number of AUMs lost under the No Action Alternative in Table 1-8 is incorrect, assuming the figures in Tables 1-7 and 3-4 to be correct. The number of AUMs lost under the No Action Alternative and the PRLA Alternative should be 1598.

41.15

Chapter 3 - Environmental Consequences.

Pages 3-84 - 3-92. Why is there no discussion of alternative mitigation measures for vegetation and grazing losses?

41.16

Chapter 4 - Consultation and Coordination.

Pages 4-80 - 4-81. While site specific analysis may be necessary to specify impacts

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Bureau of Land Management

and mitigation procedures on each tract, the DEIS needs to deal more directly with the problems of conflicts in moving grazing allotments. This issue should not wait until each mine is ready to begin. It is a serious environmental impact which this DEIS does not deal with adequately.

41.17

Social and Economic Factors.

General Comments. The DEIS ignores the impacts of coal leasing on Gallup. Neither the tables in Chapter 1 nor the discussions of social and economic factors in Chapters 2 and 3 mention impacts on Gallup. However, Map 1-1 (page 1-2) shows 12 tracts surrounding Gallup.

41.18

The document utilizes an unacceptable narrow definition of demography, using the term to refer only to population growth. However, demography also includes ethnic and racial make-up of a population, age and sex structures, income and wealth stratification, and other factors. The impacts of the proposed activities on these factors, especially on shifts in political power, are not addressed.

41.19

Chapter 1 - Description of the Alternatives.

Page 1-34. Increasing industrialization of the San Juan Basin can also be expected to affect the on-reservation Navajo lifestyle, as people may be drawn from the reservation to work in the Basin. The implications of this possibility should be discussed.

41.20

Chapter 4 - Consultation and Coordination.

Page 1-114. Although data from the 1974 BYU study and the 1980 census may not be as current as desired, doesn't BLM have the responsibility to use the most current data available? Couldn't BLM, at the very least, use these data to estimate trends in local income sources and occupational skills? By assuming that "current" data are not available, BLM is using a lack of imagination to ignore its responsibility.

41.21

American Indian Concerns.

Chapter 1 - Description of the Alternatives.

Page 1-35. The statement that impacts to sacred sites could be minimized through ceremonies is a shallow and flippant disregard for Navajo religious beliefs.

Chapter 2 - Affected Environment.

Pages 2-27 - 2-58. Aside from the notation that 65% of the local Navajos are non-English speaking, the discussion of "Social and Economic Patterns" focuses entirely on economics. No social patterns which may be affected are addressed.

41.22

Pages 2-58 - 2-59. Does the fact that Navajos are reluctant to discuss graves and sacred sites mean that BLM is obliged to ignore unknown sites? This is a patently ethnocentric position which does not accommodate the religious concepts of others. It does not offer Navajos a solution which is culturally acceptable or feasible. In effect, they are caught between a rock and a hard place and must do one of two culturally

41.23

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Bureau of Land Management

unacceptable actions: 1. discuss and interact with the dead and their graves, or 2. stand back and watch their dead destroyed. By taking this position, BLM is asserting that contemporary American society is somehow better than Navajo society and that the tenets of the latter must be subjected to those of the former.

Chapter 3 - Environmental Consequences.

Pages 3-23 - 3-24. The Foundation feels that this discussion reasonably identifies a portion of the problems involved in industrialization of the Basin and relocation of Navajo families. Unfortunately, this discussion, which is the most enlightened of the DEIS, is non-specific and non-detailed and still tends to minimize the impacts.

Page 3-89. The Foundation strongly supports stipulations in favor of Navajo hiring and training.

Chapter 4 - Consultation and Coordination.

Page 4-129. Perhaps the most glaring problem in the DEIS in this area continues to be the relocation of Navajo families who reside on the tracts. The DEIS gives the distinct impression that the effects of relocation are actually likely to be fairly minor and easily mitigated. Several studies, however, show this not to be the case. BLM continues to use vague, indirect terms to describe the effects and to insist that the problems are not BLM's responsibility.

Pages 4-130 - 4-131 (see pages 4-117 - 4-118). While these statements about relocation of families are certainly more specific than the first DEIS, BLM still has apparently not considered the impacts of family relocations in specific terms. Examples of issues in this regard include:

1. Navajo society utilizes a kin network larger than the immediate family, called an "outfit" or "resident lineage" or "coresidential kin group," which acts to support individual families. What will be the specific effects on families removed from the context of this kin group?
2. How prevalent will these effects be, given current trends in acculturation and the breakdown of traditional social structure?
3. What will be the effects on individuals within families removed from their outfits?
4. Is it more appropriate to move single families or to move groups of related families? In what situations?
5. What will be the effects on those members of an outfit who are not "directly" affected and so are not relocated?

The discussion on page 4-131 alludes to these issues; however, the callousness is almost incredible. In essence, BLM's response is to say, "That's not our problem. The Navajos will simply have to rearrange their social structure to meet the needs of the coal companies."

Page 4-134. BLM gives evidence of the same attitude in the response to the question

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Bureau of Land Management

41.25 of the estimated 65% of the population which is non-English speaking. While the text may have been "revised to include more in depth analysis of these concerns," what the text needs is more in depth analysis of specific mitigative measures or alternative actions.

Pages 4-136 - 4-137. Since BLM apparently does not care to look for specific references on prior Navajo relocations, here are four references which are quite pertinent in this regard.

Papstein, Bob, Barbara Bayless Lacy, Irene Benelly and Don Callaway
1980 Pictures of the Navajo: their health and environment in 1980.
Navajo Health Authority, Window Rock, Az.

Scudder, Thayer
1979 Expected impacts of compulsory relocation of Navajos with special emphasis on relocation from the former Joint-Use Area required by PL 93-531. Institute for Development Anthropology, Binghamton, NY.

1982 No place to go: effects of compulsory relocation on Navajo. Institute for Study of Human Issues, Philadelphia, Pa.

Wood, John J., Walter M. Vannette and Michael J. Andrews
1982 "Sheep is life: an assessment of livestock reduction in the former Navajo-Hopi Joint Use Area. Northern Arizona University Anthropological Paper, No. 1. Flagstaff, Az.

Conclusions.

The comments and issues addressed in this letter are directed toward two separate concerns. The first and most obvious is the DEIS which, although improved somewhat over its predecessor, is still very inadequate in many important regards, especially as concerns cultural resources and impacts on Native Americans. These problems may be remedied, at least in part, by a more thorough examination of the impacts of increased coal leasing and the inclusion of the results of this examination in the EIS.

The second and more critical concern is the action of increased coal leasing itself and BLM's attitudes toward the impacts of increased leasing. BLM halted PRLA leasing in 1971 because too much coal land was leased but not enough was developed. This amounted to land speculation by the coal companies. It is evident now that the need for coal has not risen sufficiently to require additional leasing. The effect of a soft coal market compounded by the availability of coal from existing leases, private production and Colorado mines is to negate the need adopted by BLM from DOE's estimates. In light of this situation, the Kit Carson Memorial Foundation is concerned

State Director
Bureau of Land Management

that BLM's proposed developments in the San Juan Basin are unwarranted and ill-conceived. Further, the impacts of these developments on cultural resources and especially on the local Native American population are inadequately conceived and unthoughtfully addressed. It is the opinion of the Foundation that there are too few good reasons to subject these resources to the overwhelmingly adverse effects of the proposed developments. The resources and inhabitants of the Basin are too fragile in nature, too complex in organization, and too important in the history of North America to be subjected to more hasty mitigation and irreversible destruction.

Sincerely,


Jeffrey L. Boyer
Curator of Anthropology

cc: State Historic Preservation Bureau
New Mexico Archeological Council
Honorable Bill Richardson
Honorable Jeff Bingaman
Honorable Manuel Lujan
Honorable Pete Domenici
Honorable Joe Skeen

Responses to comment letter #41.

- 41.1 The predicted numbers of cultural resources sites on page xv include both those in the PRLAs and the No Action Alternative. (See the first paragraph page xiv under Preference Right Lease Issuance). Table 1-7 includes the PRLAs only. A text change in Table 1-7 clarifies this.
- 41.2 See the response to comment 40.1.
- 41.3 EIM is neither conducting nor requiring conduction of systematic experiments on the effects of blasting on structures such as Chacoan pueblos. See the response to 46.13 concerning blast monitoring. Specific mitigating measures will be identified and analyzed in environmental documents prepared on specific mining operations when a mining plan is submitted for approval. Please refer to Chapter 1, Committed Mitigation Measures - Cultural Resources.
- 41.4 Table 2-9 has been changed for Catalpa Canyon, Star Lake West 2 and Divide tracts. The Tanner Ranch Site in PRLA NMG752 was originally recorded as two separate sites and were both counted in the 171 total. Before their National Register eligibility was determined the two sites were re-recorded as one site; therefore, the number of sites in the National Register column is one less.
- 41.5 No formalization of the name for this Chacoan Community has occurred. The name for this site in PL96-550 is Pierre's Site while on the National Register nomination form it is Pierre's Archaeological District.
- 41.6 Vandalism and pothunting of cultural resources in the southwest has occurred for over 100 years and is a continuing problem. The EIM is aware of this problem and has attempted to curb these actions through educational programs in the school system and monitoring and patrol programs. With increased development of the San Juan Basin, through coal development, it may be found that these programs will need to be intensified. Specific mitigating measures are not included in the second DEIS to cover these programs as they are standard programs within the EIM. Also see the response to comment 41.3.
- 41.7 See the response to comment 40.1.
- 41.8 The impacts on water supplies from reclamation activities are included in the projected impacts from mine water use in Chapter 3. Increases in water use due to projected population increases are discussed on page 3-46 and Table 3-18, and were included in the ground water impact analysis where appropriate. It was assumed that cities near the San Juan River would continue to use surface water.
- 41.9 Disruption of aquifers caused by surface mining is discussed in general terms on page 3-14 of the Second Draft San Juan River Regional Coal EIS. Specific questions cannot be addressed at this time since no specific mine plans are available. Due to the size of the region and the number of individual water users, only relatively general impacts are presented. Site-specific impacts will be identified and analyzed at the mine plan stage. Such specific information is normally presented in a mine plan and thus is not yet available.
- 41.10 Destruction of natural drainage patterns caused by diversion of surface runoff and upstream streamflow around mined areas should not affect downstream and off-lease water users. Runoff from precipitation falling on disturbed areas within the mine site would generally be impounded. During mining, the impoundment of surface runoff originating on the mined area will generally result in a slight decrease in surface water available to downstream users. After mining and reclamation these drainage patterns will be replaced, and the degree to which runoff is changed from the reclaimed area will depend primarily on the change in infiltration rates. However, it is expected that these will be similar to natural conditions. Off-lease users that are not downstream will not be affected.
- 41.11 As is discussed on pages 2-27 and 2-30 of the Second Draft San Juan River Regional Coal EIS, the primary sources of water will be from the Gallup Sandstone, the Westwater Canyon Member of the Morrison Formation, and the Dalton Sandstone Member of the Crevasse Canyon Formation. Water quality from these aquifers is given in Table 2-8 and is largely suitable for irrigation. This mitigation measure may or may not be adopted, as explained on page 3-84. Alternative water sources may be used. Research is also being conducted on irrigation with slightly saline water of salt-tolerant plant species.
- If irrigation water is essential to the reclamation plan and if that water cannot be obtained, then the mine and reclamation plan would not be approved. Without that approval mining cannot proceed (See Appendix 1-2, Section 10 Mining Plan).
- 41.12 As defined in the Glossary (GL-1) an AUM is the amount of forage necessary to sustain 1 cow (or 5 sheep or goats) for 1 month; therefore, 12 AUMs are necessary to support 1 cow (or 5 sheep or goats) for one year. The 4,268 AUM figure you refer to represents total yearly forage production on the area involved. This figure must be divided by 12 (months) before it is multiplied by 5 to determine the annual forage figure. Loss of this forage production would affect 1,778 sheep or goats on an annual basis, not the 21,000 sheep or goats that you have referred to.
- An "operator," as referred to in the "Vegetation/Livestock Grazing" sections of the EIS, is generally considered to be the livestock owner, rancher, allottee or permittee.

- 41.13 We assume your comment refers to page xiii (first paragraph) which states "These losses should be compensated....", not "will be compensated....". Compensation and associated values will be negotiated between the lessee and the individual landowner or user on all items of value. Refer to the Navajo Relocation section in the beginning of Chapter 4.
- 41.14 Qualified surface owners and authorized occupants would negotiate directly with coal lessees. The BLM believes it is inappropriate to negotiate for these individuals. The unauthorized occupants would be relocated preferably within chapter boundaries. The lessee would have to obtain land forage through purchase, lease agreement, exchange or other legal means of acquisition. The BLM has no funding source to obtain land, forage, or water for unauthorized occupants.
- 41.15 The No Action Alternative for competitive coal is the projected situation for years 1987 and 2000 and PRLA issuance. The PRLA No Action Alternative is the projected situation, if no action is taken on processing the PRLAs. The 3,157 AUMs lost under No Action plus 2,032 AUMs for PRLAs equals 5,189. The AUM figure of 2,041 in Table 3-4 is incorrect. The text has been changed.
- 41.16 On Public lands grazing is protected by Section 402 of the Federal Land Policy and Management Act. If grazing is temporarily suspended, the allottee receives a 2-year notice prior to suspension. The grazing privileges are suspended until the area is reclaimed, then the allottee may graze the area again. Grazing on the public land is a privilege held by the permit holder; therefore, there would not be any reimbursement rights on any portion of a permit suspended due to mining activities. However, the lessee would reimburse the operator for range improvements which he installed. On other lands the BLM has no jurisdiction over grazing privileges or rights. It is the responsibility of the individual, the tribe or the BIA to negotiate with the coal lessee.
- 41.17 The Navajo Relocation issue has been discussed more fully at the beginning of this comment and answer section in Chapter 4. There is discussion of the effects of relocation and suspension of grazing permits in American Indian Concerns section on page 3-24 and in the Vegetation/Livestock Grazing section page 3-32. In addition, the responses to your previous comments 41.13, 41.14, 41.15, and 41.16 have discussions of grazing impacts.
- 41.18 See the response to comment 11.2.
- 41.19 It is a fact that not all demographic factors were addressed. However, page 2-47 addresses a tri-ethnic culture with Table 2-13, page 2-48, providing a breakdown of ethnic mix by community and county. Page 2-47 addresses population density. The alterations that could result from changes in ethnic mix were addressed in the first paragraph on page 3-51. We have not been specific on the ethnicity of immigrant workers; but an area, such as Cuba with a high percent Indian and Hispanic, would be impacted if most of the immigrants were White, non-Hispanic.

- 41.20 The significant levels of impact from regional trends toward industrialization are expected to occur in the Eastern Navajo Agency area east of the reservation. The impacts on the reservation are not expected to reach significant levels. However, impacts on a localized or individual basis could range from one person being employed and providing the economic base to enable other family members to maintain a more comfortable traditional lifestyle, to providing a more comfortable economic lifestyle for a family that would lead them totally away from the traditional lifestyle.
- 41.21 See the response to comment 11.3.
- 41.22 The American Indian social factor which may be affected is primarily their pastoral lifestyle. The family works together to tend the livestock, primarily sheep and goats. This lifestyle brings the person into close contact with nature. This ties into their native religion and relates the daily well-being to their Deity. This relationship depends on how they use their Deity's creations or the natural resources around them.
- 41.23 Mining would not only disturb the earth which has religious consequences but it would also destroy portions of the source materials used in some of their sacred ceremonies. It would also disturb some sites where certain ceremonies or practices are to be performed. Refer also to the American Indian Concerns sections in Chapter 3.
- 41.24 See the response to comment 9.3.
- 41.25 See the responses to comments 11.3 and 11.15.
- 41.25 Specific mitigation measures have been thoroughly analyzed and listed in various sections of the DEIS (refer to pages 3-89 thru 3-92 and Appendix I-2). Further mitigation measures to reduce the impacts of mining on the Navajo people have been developed and included in the Additional Mitigating Measures section in Chapter 3.

STAR LAKE RAILROAD COMPANY

80 EAST JACKSON BLVD., CHICAGO, ILL. 60604. TELEPHONE: (312) 427-4900

November 9, 1983

Mr. Charles W. Luscher
November 9, 1983
Page 2

2. Nothing has occurred since the Star Lake-Bisti Regional Coal Environmental Impact Statement became final in April of 1979 which would change in any way the environmental soundness of the proposed Star Lake route.

3. Comments submitted by the Sierra Club and Audubon Council and reproduced in the Cumulative Overview at page CI-156 include a statement that the Star Lake-Bisti Environmental Impact Statement was not adequate because it did not give serious consideration to alternative development policies and was lacking in detailed information on the San Juan basin area. This statement is grossly erroneous and, as clarified by the U.S. Court of Appeals for the District of Columbia Circuit in its March 1, 1983, Decision, the Environmental Impact Statement for the Star Lake Railroad was an exhaustive, comprehensive and accurate analysis of the anticipated environmental impacts resulting from that railroad. Alternatives and detailed information concerning the Star Lake-Bisti area were comprehensively covered in the Environmental Impact Statement for the proposed railroad.

42.1

Star Lake Railroad takes this opportunity to comment on the second draft of the San Juan River Regional Coal Environmental Impact Statement (EIS) and on the Final San Juan Basin Cumulative Overview and the Comment Letters which are reproduced therein.

There are numerous references to the Star Lake Railroad in both the draft EIS and in the Final Cumulative Overview and the comment letters. We feel that certain clarifications are necessary to set the record straight concerning the proposed Star Lake Railroad.

1. The impact of the Star Lake Railroad with respect to wilderness values, noise and vibrations were thoroughly reviewed in the Star Lake-Bisti Regional Coal Environmental Impact Statement, which became final in April of 1979. These impacts were found to be de minimus and the proposed route was endorsed as the most environmentally sound alternative based on a comparison with several other proposed alternative routes.

Dear Sir:

Re: Second Draft San Juan River Regional Coal Environmental Impact Statement and Final San Juan Basin Cumulative Overview and Comment Letters

Mr. Charles W. Luscher
State Director
New Mexico State Office
Bureau of Land Management
Caller Service 4104
Farmington, New Mexico 87401

4. Finally, it should be noted that there are several incorrect references to the "Star Lake-Bisti Railroad" and these should be corrected to reflect that the railroad will be called simply the Star Lake Railroad.

Thank you for your consideration of the foregoing comments.

Respectfully submitted,

STAR LAKE RAILROAD COMPANY

BY: Gus Svolos, General Counsel
Star Lake Railroad Company

Responses to comment letter #42.

42.1 Every occurrence in the text actually refers to the Star Lake Railroad instead of Star Lake - Bisti Railroad.

November 17, 1983

TAOS ENVIRONMENTAL ASSOCIATION

P.O. Box 6040
Taos,
New Mexico 87571



Bureau of Land Management
Farmington, New Mexico

Dear Sir:

Mr. Garrey Carruthers is hardly to be thanked for purposely curtailing the public participation process by making it impossible to have a chance to comment in person. The November 21st hearing was held in Farmington, not Albuquerque, Santa Fe or Taos, main political centers of the state and centers of vociferous opposition to the BLM's coal leasing plans. Obviously the BLM is trying to muzzle public comment. To make matters worse, a storm arose in the afternoon of November 8th, prevented contingents of concerned citizens from reaching Farmington. In all fairness, the BLM should provide another meeting for public discussion and comments.

The following are reasons why the second coal draft EIS on the San Juan River Area is invalid, and why a better and competent document should be issued.

1. There is no reference to how the relocation of the Navajos is going to take place, what are its immense costs to the U.S. taxpayers, how it will affect the Navajos and how it will be brought about. Obviously by saying nothing about the issue does not make it go away. It only shows that the BLM is embarrassed that it has no solutions and plans by its silence to sweep a dirty mess under the rug.

2. New competitive coal leasing is still not necessary in the San Juan Basin. More coal production is not needed, and phony government statistics blindly trying to rationalize the destruction of the Basin is indeed criminal. The BLM projections and statistics continually change and vary they are not believable or credible. DOE's goals are inflated and ever these could be met without competitive leasing increases. Refer to the comments by the Environmental Defense Fund.

3. The PRLA's can and should be denied. ^{The BLM} It has not promised to include "alternating mitigating measures" that it has the power to include through NRDC vs. Basklund to put restrictive lease stipulations to protect the ^{the} Indian population on the cheiboard area.

(over)

4. Important criticisms on ~~water~~ reclamation, socioeconomics, and paleontological havoc, the drain on crucial water resources have never been seriously dealt with. This is a must. Reclamation is nearly impossible. The destruction of the old Navajo social and economic way of life is undeniable but the BLM ignores them in this draft. Religious ruins and sites will be haphazardly destroyed without the Navajos direction and consent, since they will have nothing to do with the graves of their ancestors.

5. The BLM will not guarantee that Navajos would be employed. Much of this rationalization is a ploy to cover up the destruction of their homeland.

The Second Coal Draft EIS is totally inadequate and truly a professional one should be shown to the public. Better still the whole plan for coal development in this complicated area should be dropped for other more suitable areas in the state that are less complex and destructive to the Navajo people, the Chaco prehistoric sites and the paleontological treasures located in this site selection.

Yours truly,

Larry Frank
Larry Frank,

Member of the Board of The Committee To Save The
Rio Hondo. (Membership approximately 500 people)

Responses to comment letter #43

43.1 Each relocation effort will be handled on a case-by-case basis using one of the methods listed on page 3-90 of the DEIS. Costs of relocating families will be absorbed by the lessee. The effects of relocation on the Navajos are discussed in Chapter 3, in the response to comment 15.1 on pages 4-129 through 4-132 of the Second DEIS, and the Navajo Relocation section at the beginning of Chapter 4.

43.2 Please refer to the Additional Mitigation section in Chapter 3.

(Typed for Reproduction Purpose)

Mr. Bill Luscher
State Director, BLM

Dear Mr. Luscher,

(1) New competitive Coal Leasing is still not necessary in the San Juan Basin. More coal is not needed (2) PRIAs can and should be denied. (3) The people who live in this area should not be pushed aside as if they did not count. (4) If mining were done, reclamation is probably not really possible. (5) Water is a critical resource and there is not enough for coal development. Please extend the comment period on the DEIS. At a later date this coal can be mined (if necessary) with more profit to the State of New Mexico.

/s/ Arnold Kesbulla
/s/ Mrs. Carolyn Kesbulla

No substantive comments in letter #45.

exploited these people for hundreds of years. I think they should have a priority in the decision making affecting their lives and land. I have read many of the testimonies given at the previous hearings held at the Eastern Agency. I implore you to re-consider coal stripmining in the San Juan Basin at this time.

Sincerely,
Kay Barrett

Additional concerns enumerated in the latest DEIS:

200 acres of deer and elk winter range in addition to bawls and picnic could be designated.

3,637 (approximately) fossil localities could be disturbed.

Decrease in water quality could occur.

Substantial disruption to the lives of several hundred Navajo families will occur. (I can't emphasize this concern enough).

Responses to comment letter #44.

44.1 See the response to comment 9.4.

SUNBELT MINING COMPANY, INC.

P.O. BOX 2106
ALBUQUERQUE, NEW MEXICO 87103
505-883-6530

November 18, 1983

State Director
Bureau of Land Management
Caller Service 4104
Farmington, NM 87401

Re: San Juan River Regional Coal Environmental Impact Statement

Dear Sir:

Sunbelt Mining Company, Inc. has reviewed the draft regional coal EIS. The document appears to be complete and to have addressed the major concerns raised by interested parties in a very comprehensive manner. We are also pleased to note BLM's attention to detail and thoroughness in evaluating all of the major alternatives. Our comments are as follows.

1. General Stipulations, p. 1-16, 1st paragraph, 1st sentence - this statement should clearly state that a federal coal lease owner must submit a mine plan and mine permit application to BLM and OSM, and receive approvals for both, prior to the development of a mine. Use of the term "lease operator" could confuse the public by implying that submittal of a mine plan and permit application could occur after the startup of mine operations.

2. Cultural Resources, p. 1-17, Blasting - the requirement for a mine-related blast monitoring program approved by BLM is not necessary. Full regulatory authority, jurisdiction and technical expertise for developing and implementing a blast-monitoring program resides with the New Mexico Mining and Minerals Division (M&MD). We urge BLM to restructure this stipulation to account for this existing regulatory mechanism.

3. Housing, p. 2-50 - Table 2-15 is missing from the text.

4. Social and Economic Factors, p. 3-4 - Severance taxes are understated. The current severance tax rate is 96.5¢/ton with an inflator tied to the Consumer Price Index. Subsequent calculations should be adjusted to reflect the current tax rate.

5. Paleontology, p. 3-8, 1st paragraph - the DEIS misstates the paleontologic facts by claiming the transition period from dinosaurs to mammals is found within the Fruitland-Kirtland deposits. According to Figure 2-3 and text on p. 2-17, the Fruitland-Kirtland does not contain

State Director

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November 18, 1983

fossilized mammal remains. The mammalian-dinosaur transition zone occurs in the Ojo Alamo-Kirtland Shale contact. The existing contact areas are well removed from areas of potential surface mining interest.

6. Reclamation Potential, p. 3-11, 2nd paragraph - contrary to BLM's statement, revegetation of the Gateway Mine will not be adversely affected by the presence of sandstone overburden. In fact, selected sandstone materials encountered during mining will be recovered and used as topdressing. An in-depth assessment of the reclamation/revegetation plan at Gateway found that use of sandstone topdressing would create a better growth medium for vegetation than is now provided by the existing surface materials.

7. Surface Water Quantity, p. 3-12 - the assessment of extensive mine dewatering is not applicable to the Fruitland-Kirtland Formation, as these coal deposits are not saturated or wet.

8. Groundwater Quantity, p. 3-14 - the Pictured Cliffs Formation, underlying the Fruitland Formation, is not widely considered to be an aquifer due to very low transmissivity values. Quality of PC water is also very poor. The statement is also made that these sandstones would not be completely destroyed, but well yields could be locally affected by mine dewatering practices. Mining of the Fruitland however, would not penetrate the surface of the PC as there are no economically recoverable coal deposits below the PC. Hence, destruction of the PC or any individual segment is highly unlikely. Given that the Fruitland Formation is not wet, the need for mine dewatering does not exist. Thus, adverse effects on PC wells, if in fact there are any, would not occur.

It should also be noted that discussions of possible groundwater drawdown from deep aquifers constitutes a worst-case assessment. On-going reclamation research has indicated a very positive potential for successfully revegetating without the need for irrigation. While BLM's assumptions on mine water usage are not stated, we estimate that irrigation needs would probably account for approximately two-thirds of anticipated total mine consumption. If irrigation is found not to be essential for mine land revegetation, or necessary in lesser quantities than currently envisioned, ground water depletion could be much less than anticipated by the DEIS.

9. Grazing, p. 3-17 - reclaimed mine lands could be restored to grazing uses much faster than stated in the DEIS. Each year's reclamation area is separately evaluated in terms of release of the reclamation bond 10 years after final seeding, irrigation or fertilization. As reclamation closely follows the mining sequence, it is conceivable, and highly probable, that mined lands will begin to be restored to grazing usage beginning 11-12 years after commencement of mine operations, and continuing over the life of the mine. The DEIS implies that reclaimed lands would not be restored to grazing until mining of the entire tract is fully completed.

10. American Indian Concerns, p. 3-23 - the statement that up to 22,000 Navajos may suffer increased levels of mental illness as a result

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of coal development is made without any basis in fact. A more realistic appraisal would focus on actual numbers of persons directly affected in order to be consistent with similar discussions in other parts of the DEIS.

The general estimate of 20-40 years passing before grazing could resume is inconsistent with the revegetation/bond release discussions presented in comment #9.

The positive benefits of mine development to Navajo residents in the area is largely ignored. The Navajo people have one of the highest birth rates in the world and a fixed land base. These factors dictate that the Navajo's traditional herding lifestyle will rapidly cease to be viable in terms of providing income and support for younger generations. It would appear that, without jobs being created in the area, younger Navajos will be forced to accept either substandard employment situations, assuming employment can be found, or to leave the area for employment opportunities elsewhere. Culturally speaking, out migration of a significant proportion of young Navajos, or moral debilitation from under or non-employment, is likely to generate substantial adverse cultural impacts. Mining, and associated activities would serve, by the creation of direct and indirect employment opportunities, to provide a local means of support for large numbers of Navajo people. As this development would take place within an area that is home to a people with current unemployment rates reputedly exceeding 70 percent, development of mining and related jobs would appear to create substantial positive economic and cultural benefits that have not been thoroughly investigated in the DEIS.

11. Cultural Resources, p. 3-34 - the DEIS expresses concern that mine-related blasting could adversely impact masonry structures and rock cairns in the area. However, M&MD has jurisdiction over mine blasting, and requires all mine operators to conform to blasting standards established and designed to protect against off-site damage to structures, geologic formations and the like. In addition, M&MD has the authority to control blasting programs to provide whatever amount of protection is necessary to avoid off-site damage. In essence, controls are already in place to protect potentially effected dwellings and structures.

12. Recreation, p. 3-37 - The DEIS asserts that noise and dust from mining operations would adversely effect recreational experiences in the Bisti WSA and Chaco Canyon. These technical issues have been aired previously in 1982 in the Gateway Mine unsuitability petition hearings before M&MD and, on appeal, by the New Mexico Coal Surface Mining Commission. In these proceedings, it was amply demonstrated that these are not significant or major concerns. Noise from mine operations quickly dissipates over very short distances to ambient background levels. Dusts are easily controlled by wetting haul roads or application of chemical control agents. Additional details are available from the hearing records on file at M&MD in Santa Fe.

State Director

November 18, 1983

Table 3-11 lists acreage unavailable for public usage during the period the proposed mines are in operation. Data from this table conflicts with data given in Tables 3-2, 3-3 and 3-4.

13. Information regarding severance tax revenues in Table 3-17 should be adjusted according to information presented in comment #3, above.

14. PRIA Sub-Alternative, p. 3-57 - the rationale stated in the DEIS for not preserving the Fossil Forest is sound as it is based on a consensus of opinions from the professional paleontologic community. Preservation of this area should not be extended beyond the 10 year period allowed for scientific study. The dearth of scientific interest in excavating fossils from within this area provides ample evidence that the supposed wealth of scientifically significant paleontologic values reputed to be found in this area simply do not exist.

Likewise, preservation of Ah-shi-sle-pah WSA for inclusion in the National Wilderness Preservation System is not sound policy. According to BLM's in-depth assessments of this area, the characteristics and features of Ah-shi-sle-pah are redundant to, and are of a lesser quality than, those of the Bisti and De-Na-Zin WSAs. The coal resources of Ah-shi-sle-pah are too valuable of a resource to be ignored and set aside in favor of preserving an area of only marginal recreational or visual interest.

15. Visual Resources, p. 3-64 - Fossil Forest is described as having "good sightseeing values", yet it is ranked as Class C (low scenic value) in the Draft Environmental Assessment for PRIAs, BLM, 1981. The DEIS also states that Bisti tract #4 is in the Fossil Forest, when in fact it is not. Bisti tract #6 is described as being within a "scenic badlands area" although the majority of the area is in a rolling, sandy uplands area.

16. Wilderness, p. 3-65 - effects from mining Bisti tract #6 would be virtually unnoticed on the Bisti WSA as it is considerably removed from the boundaries or viewscape of the WSA.

17. Recreation, p. 3-65 - effects from mining Bisti tracts #4 and #6 should be restated in light of comments #14 and 15, above.

18. Irreversible and Irrecoverable, p. 3-98 - DEIS statements regarding paleontology should be restated in view of comment #4, above. This concludes our comments. Again, we feel BLM has done a very commendable job of evaluating the actions set forth in this document.

Very truly yours,


Robert A. Jackson
Manager, Corporate Affairs

RAJ/jr

Responses to comment letter #46.

46.1 The text has been revised.

46.2 The text has been revised.

46.3 Table 2-15 is presented on page 2-51 beneath Table 2-14.

46.4 Under present law the severance tax changes each year are based on the change in the Consumer Price Index. It could also be changed by legislative action. Between the initial preparation of this document and November 1983 there has been a 23-percent increase in this tax so that the severance tax figures shown are approximately 23 percent lower than they would be at the current rate.

46.5 The first paragraph on page 3-8 of the DEIS states, "Fossils found in the Fruitland/Kirtland Formations are an important part of an almost complete biostratigraphic sequence of events which [when taken as a whole] depict one of the most important episodes in evolutionary history -- the transition from domination of terrestrial communities by dinosaurs to domination by mammals". This statement does not claim that the transition period from dinosaurs to mammals is found within the Fruitland/Kirtland deposits. It does state that the Fruitland/Kirtland Formations play an important part in this transition. For further information, please refer to the Final San Juan Basin Cumulative Overview and Comment Letters, pages co-34 and 35, Comment and Response number 8.

Also, in reference to the comment that, "according to Figure 2-3 and text on page 2-17, the Fruitland-Kirtland does not contain fossilized mammal remains," mammals are members of the subphylum Vertebrata and are classified as "other vertebrates". Figure 2-3 is a general stratigraphic section meant only to illustrate the predominant life forms at specific geologic time periods.

On page 2-17, the text states that there was a change in dominant vertebrate types from one stratigraphic level to the next. The dominance of one faunal type over another through time does not relegate the less-dominant form to non-existence. Also, we are not aware of any reliable scientific data which indicates that the "mammalian-dinosaur" (should be "dinosaur-mammalian") transition zone occurs in the Ojo Alamo-Kirtland Shale Contact. In fact, data is now beginning to suggest that this transition zone may well be somewhere within the lower conglomeratic sandstone of the Ojo Alamo.

46.6 It is true that using sandstone overburden material, in most cases, presents more difficult reclamation problems compared to using the original topsoil. However, where soil material is lacking or highly unfavorable to plant growth the sandstone overburden may be the best revegetation medium.

46.7 The term "extensive" is used in connection with ground water withdrawals from major aquifers, and is not intended to apply to mine dewatering. Your statement is essentially correct for surface coal mining although minor amounts of water may be encountered in the overburden in the Fruitland Formation coal trend. Significant quantities of water could be encountered during underground mining.

46.8 The Pictured Cliffs Sandstone does provide water locally in small amounts for smaller water supplies. The terms "major" and "minor" aquifers are relative, and the Pictured Cliffs Sandstone is referred to as a minor aquifer (page 2-30). The statement on page 3-14 is intended to apply to underground mines; your comment is basically correct as applied to surface mines. Also see the response to comment 46.7.

46.9 Your comment is appropriate and acknowledged. It is indicated in the Analysis Framework, page 3-1 of the Second Draft San Juan River Regional Coal EIS that these projected impacts are worst-case estimates for each alternative. Also see Appendix B-11 of this same document.

46.10 Generally, grazing will be allowed to resume on an average of between 20 to 40 years after the area is opened up for surface mining (this takes into consideration the life of the mine plus 5 to 10 years for reclamation). Less acreage would be disturbed for smaller mines; therefore, a shorter time frame would be required before grazing could resume. The actual availability of the reclaimed area for grazing would depend upon the procedures and time frame specified for reclamation in a mine plan and the success of the reclamation.

46.11 The statement that up to 22,000 Navajos may be affected by coal development is an estimate of the number of Navajo people living in rural areas within the San Juan Basin. This figure was derived in part from the Division of Indian Health Service based in Crownpoint which provides health care for about 17,000 Navajos living in a 3,500 square mile area of the San Juan Basin. For the actual numbers and locations of persons directly affected by the proposed coal development, refer to Appendix F of the DEIS. At this stage in the coal leasing process it is only speculative to determine the specific individuals, other than those who now live within the tract boundary, that will be impacted as a result of coal mining or the extent of that impact.

46.12 Positive benefits from mining and associated activities will occur by providing direct and indirect employment opportunities for the people in the area. As discussed on page 3-24 of the DEIS, higher paying jobs created by mining and associated activities could improve the standard of living for families in the area. Other positive benefits are also discussed here.

- 46.13 It is recognized that the State of New Mexico Minerals and Mining Division has jurisdiction over blasting standards and are well established for conventional structures; however, little is presently known about blast damage parameters on cultural sites. BLM and other State and Federal agencies will, therefore, continue to be actively involved in determining safe parameters.
- 46.14 The numbers presented in Tables 3-2, 3-3 and 3-4 are concerned only with surface acres disturbed. The numbers presented in Table 3-11 reflect the total acreage fenced off and which are unavailable for public use.
- 46.15 The visual resource inventory which shows a Class C or low scenic quality value for the area in which the Fossil Forest is located is based on a broad scale analysis. At this scale an overall ranking was applied. The breakout of small incursions such as the Fossil Forest within these larger homogeneous units was not attempted at the time inventory was done. When dealing with larger units there can be incursions that may either have scenic values higher or lower than the overall ranking. The text within the Visual Resource Section, page 3-64 has been revised to avoid any reference to Tract #4 being within the Fossil Forest.
- The text has been revised within the Visual Resource Section, page 3-64 to avoid any reference that the entire Bisti Tract #6 lies within a scenic badlands area.
- 46.16 Bisti Tract #6 parcels would fall within the middleground zone of an observer looking outward from the Bisti WSA. Middleground or the intermediately distant landscape is the most critical, because the linkage between parts of the landscape may be seen. Consequently, the middleground aspect can best show whether man-made changes rest easily or uneasily on the landscape.
- 46.17 The text has been revised in reference to Bisti 4 and Bisti 6 as described in comment 46.15.
- 46.18 The "Fossil Forest" has a long history of scientific research (interest) dating back to the early 1920's when Charles Sternberg made his internationally known collections for the University of Uppsala in Sweden, the American Museum in New York and the Chicago Natural History Museum. After a brief lull extending into the 1960's renewed research efforts were begun by Dr. William A. Clemens then of the University of Kansas in the 1970's. Additional research was conducted by vertebrate paleontologists and students from the University of California at Berkeley, the American Museum of Natural History, the University of Arizona. From 1977 to the present, the University of New Mexico, the University of Minnesota, paleontologists from the Bureau of Land Management, and from the State of New Mexico's own Bureau of Mines and Mineral Resources conducted research. That research is still ongoing and

46.18 It is known that the area contains a unique and rare fossil assemblage and represents a cross-section of late Cretaceous depositional environments, habitats and biota (Rigby and Wolberg 1983).

In summary, the paleontological characteristics of this area and the opinions and experience of professionals with creditable qualifications establish the significance of these paleontological values. Thus, the irreversible and irreplaceable nature of the proposed action remains as stated in the EIS.

November 18, 1983

Charles W. Luscher
Bureau of Land Management
Caller Service 4104
Farmington, New Mexico 87401

Dear Mr. Luscher,

The FCO recently issued for the San Juan Basin states in its abstract that it "is intended to facilitate the decision making process by providing information to the BLM State Director, the Secretary of the Interior and the public...". This indicates that the public is somehow involved in the decision to be made, and yet, nowhere in the FCO is any tabulation made of public opinion. Public "comments of a substantive nature" are reprinted in abundance, but for readers interested in an "overview", which this purports to be, there is no simple pro or con reference.

Of the 374 written comments sent regarding the DCO, how many were opposed to the various projects outlined? How many supported the projects and what were their affiliations? Data of this nature gets at the heart of public comments far faster than reprints of official memoranda and letters. If you have individual support for a project, and you have made serious efforts to recruit representative comments then you can assume fair public support for a favorable decision. If, however, you make efforts to limit public information and involvement in the decision process, as you clearly have done on this "Action Plan", and you receive overwhelming criticism of your plan, then you can be equally assured that the public does not support you.

It seems that presenting information clearly and concisely to the public is beyond your ability, and that including the public in any real sense is not your intention. The BLM's original purpose was to manage grazing land, not to make decisions on the development for an entire region which they are not qualified to do. The land in question is not even under your purview if the letter from the Bureau of Indian Affairs is accurate. Instead of spending time and money to justify a plan, which is clearly premature as well as harmful, why not work on a well-researched "Regional Plan" for the area? Beneficial development would be welcomed by all sectors, while this series of projects cannot be.



Teresa C. Seamster
Aztec, New Mexico

DNA-PEOPLE'S LEGAL SERVICES, INC.

POST OFFICE BOX 306
WINDOW ROCK, NAVAJO NATION, ARIZONA 86515
TELEPHONE (502) 871-4151

November 18, 1983

State Director
Bureau of Land Management
Caller Service 4104
Farmington, New Mexico 87401Re: San Juan River Regional
Coal EIS, Second Draft

Dear Sir:

As legal representative of individuals and local Navajo governments in the San Juan Basin, DNA-People's Legal Services, Inc. thanks you for the opportunity to comment on the Second Draft of the Regional Coal EIS. Our specific comments are as follows.

CULTURAL RESOURCES

1. The EIS states that 7 tracts lacked sufficient cultural inventory to apply unsuitability criteria 7. If additional information is gathered on these tracts, it cannot simply be inserted in the final EIS. A supplemental draft is required.

2. The EIS states that tight timeframes rarely allow for the analysis of cultural site data at the time it is collected. The EIS also states that money for such analysis often is unavailable at a later time. P. 3-34. The same paragraph of the EIS states that it is unlikely that the integrity of cultural sites on PRLAs can be maintained without continual on-site monitoring. This paragraph suggests that adequate mitigation is not in fact available for properties eligible for the National Register of Historic Places. It also indicates the need to publish in the EIS, and to have the Secretary consider, lease stipulations requiring not only data collection, but data analysis by the lessees, and requiring on-site monitoring by the lessees.

48.1

RECLAMATION

3. Granting of the mine permits for Burnham and Gateway mines, especially on the experimental basis, does not establish that revegetation on the proposed lease tracts would be successful. Indeed, the granting of permits for

48.2

these two mines demonstrates that once leases are issued, there is little hope that mining will not follow, no matter how adverse the reclamation potential of the tracts.

4. The cost of acquisition of detailed soil and revegetation information on each tract is stated to be exorbitant. P. 3-12. If the cost of this information is exorbitant now, why will it not be so later, at the mine permitting stage?

48.3

5. The EIS states that mining companies will obtain most water for reclamation from deep aquifers beneath the mines. P. 3-14. In a number of the tracts, this statement may be misleading, because those aquifers do not have water of high enough quality to be used for reclamation. If it will be necessary to treat water before using for irrigation, the EIS should at some point mention this fact and indicate what impacts will occur from constructing and operating such treatment plants.

48.4

TRANSPORTATION

6. The description of the no action alternative, p. 1-4, states that the Star Lake Railroad is a federally-approved project. This is misleading. Although federal rights-of-way may have been granted, the railroad has yet to receive a certificate from the Interstate Commerce Commission which is essential to the proposed operation.

48.5

7. The EIS continues to assume that workers will commute in carpools with two persons per vehicle. P. 3-4. There is no indication in the EIS that workers at other similar projects have in fact car-pooled to this extent. A lower and more reasonable number of persons per vehicle should be assumed.

48.6

PALEONTOLOGICAL RESOURCES

8. The proposed lease terms require only reports regarding larger and more conspicuous fossils. See p. 1-18. This stipulation is unreasonable in light of the comments at p. 3-9 that the most significant paleontological resources are small. The lease stipulation should require protection of any significant fossils discovered, regardless of their size.

48.7

AIR QUALITY

9. The EIS continues to assume a background air

48.8

quality level of 30 micrograms per cubic meter as recorded at Zuni, New Mexico. P. 3-3. Use of this figure is not reasonable. Zuni Pueblo has extensive urbanization and resulting air pollution. The value of 7 micrograms per cubic meter for Chaco Culture National Historic Park is more accurate and should be used.

48.8

10. The first alternative mitigation measure for air quality, p. 3-85, is not in fact a mitigation measure. It does not specify the steps which could or would be taken to protect air quality within the CCNHP.

48.9

WATER RESOURCES

11. The first alternative mitigation measure for water resources, p. 3-86, prohibits use of certain poor-quality water for revegetation. The EIS, does not, however, address the impacts of thus prohibiting supplemental irrigation, which is a vital element of the so-called revegetation regime, which has been developed for use at mines in the Basin. Nor does the EIS address the alternative mitigating measure of requiring treatment of such water prior to its use in irrigation.

48.10

12. The first Draft made reference to the potential of groundwater extraction to diminish or eliminate the flow of springs in the Chuska Mountains. The Second Draft appears to omit any reference to these springs, and thus fails to discuss a potentially significant impact to Navajo livestock operators in the Chuskas.

48.11

AMERICAN INDIAN CONCERNS

13. One of the greatest flaws of the First Draft is perpetuated in the Second Draft EIS. The EIS continues to state baldly, as at p. 1-32, that "other areas for livestock grazing could be found for Navajo families who lose their grazing areas...." The EIS does not meaningfully address where such areas could be found, nor what procedures would be used to integrate the relocatees into other grazing communities. The EIS states, at page 3-32, that relocated individuals could be absorbed into other grazing allotments by reducing the number of animal units each person could run. The EIS does not indicate what government agencies and processes would be used to so alter previous grazing arrangements, nor does it indicate whether there is any real possibility that the affected allotments would be willing to absorb

48.12

48.12 relocatees. The EIS also states at p. 3-32 that if operators were adequately compensated for lost forage they could lease pastureland or feed their stock. This page further states that existing statutes will provide effective protection for operators. The EIS, however, proposes to wait until mine permitting to determine what relocation measures will be required. Moreover, it proposes to leave it up to the mining company and the affected individuals to determine what compensation will be paid. See p. 4-126. The failure to address these questions in the EIS makes it impossible for the decision-maker, who is in Washington, D.C., and doubtless knows even less about the San Juan Basin than he did about African heads of state to determine whether relocatees will or will not face a reduction in forage and water availability and a concomitant reduction in the numbers of their stock.

48.13

14. The discussion, on p. 3-56, of compensation to relocatees, is confusing and misleading. This discussion states that significant financial benefits may accrue to persons living on PRAs, from compensation for use of their land by miners. The significance of these benefits is questionable, unless BLM intends to require more than just compensation for improvements. It is likely that the fair market value of, for example, a hogan and a corral will be minimal.

48.14

15. It is gratifying that the BLM has at least drafted alternative mitigation specifying compensation for unauthorized occupants. P. 3-91. It is disturbing, however, that BLM has failed to recommend adoption of this measure. Moreover, the compensation proposed in this alternative mitigation measure is still inadequate. Relocatees whether authorized or unauthorized occupants, should be reimbursed for the grazing value of their land, at the very minimum. Given the federal trust responsibility to the affected Indians, BLM should propose an active federal role in overseeing relocation compensation, to the end that relocatees will receive the maximum compensation prudently obtainable for loss of use of their interests in the surface of the affected lands. This is clearly permissible under the statutory provisions allowing BLM to consider the equitable interests of occupants of surface estates over federal coal.

48.15

16. On page 4-130, response to comment (5), the EIS states that compensation would be negotiated between the lessee and the individual land user. This section also implies that all items of perceived value, monetary or non-monetary, may be compensated for. Although it would

48.16

clearly be proper, under the federal trust responsibility, to require compensation for non-monetary losses, the BLM's present regulations and interpretations of its statutory responsibilities do not include a duty to provide such compensation.

48.16

17. The response to comment 15.13, p. 4-135, states that gravesites will receive all applicable state and federal legal protections. The EIS should summarize what protections are available.

48.17

18. The special lease stipulations described in Appendix I-2 are inadequate. For example, the stipulation for NM-585, 8128, 8130, 8717, and 6801 provides that unauthorized dwellings will be relocated. The stipulation should declare these dwellings and an area within 300 feet of them as unsuitable for surface coal mining. At a very minimum the stipulation should provide that relocation details will be worked out with the resident, and the affected individuals and chapters in proposed resettlement areas, with the input and supervision of the Bureau of Indian Affairs. Furthermore, this stipulation should require that areas of resettlement must have sufficient water and forage, rather than simply indicating that they should have such.

48.18

SOCIAL AND ECONOMIC IMPACTS

20. The BLM refuses to acknowledge that mining of newly leased tracts could occur at the expense of production on existing mines. See p. 4-121, response to comment 14.14. BLM states that it has no information to support the proposition that mining on new tracts would decrease mining elsewhere. In fact, such information was provided in the comments of, inter alia, the Environmental Defense Fund. Moreover, BLM apparently does not recognize that existing contracts may expire and be shifted to new mines, nor that new demand could be supplied by existing mines if no further leasing occurs. Similarly, the EIS fails to acknowledge any competition between the proposed federal coal leases and potential leasing by the Navajo Nation in areas very near the PRLAs and competitive tracts.

48.19

21. The EIS continues to assume that population in Crownpoint would not significantly increase. P. 4-15, response to comment 14.25. The justification for this assumption, that mine-workers would prefer to live in communities where they can have more input in community

48.20

48.20

affairs, is not supported by experience in other areas of burgeoning mineral development. Mine workers in such areas frequently move into communities where their status as outsiders prohibits much involvement with the existing community. E.g., Decker, Montana or Buffalo, Wyoming. In addition, mine employees are not known for their strong interests in participating in local government. Many are semi-transient.

48.21

22. The EIS states that wage and payroll figures are not of use in identifying economic impacts on a regional basis. P. 4-120, response to comment 14.10. Since the most significant, and possibly the only positive economic impact of development for the local area will be through wages and payrolls, it is difficult to see how this information could not be of use.

48.22

23. The EIS states that coal development would replace the current regional "bust" in mineral industries. P. 4-127, response to comment 14.35. The EIS should also note that future depressions in the proposed coal industry would likely coincide with depressions in other energy-mineral industries, thereby accentuating future "busts."

GENERAL COMMENTS

24. One of the most disturbing aspects of the second EIS is the fact that, while it lists possible additional mitigation measures and lease stipulations, it does not propose that any of these additional measures be adopted. This clearly suggests that the new draft has been prepared to address certain legal niceties, and not because of any new commitment by the BLM to respect its duties to protect the environment and to safeguard the welfare of Navajos living in the affected area.

48.23

25. In addition to the Executive Order 709 lawsuit, which is referred to on p. 1-31, the EIS should note the filing of a suit captioned Etsitty, et al. v. United States, et al., D.N.M., Civ. No. 83-1408C. The EIS should briefly address the potential effects of this lawsuit, which claims that the U.S. does not own some of the coal it proposes to lease, and that surface mining on Indian allotments may be impermissible.

48.24

26. On p. 4-4, the first paragraph under the heading "Surface Owner Consultation" is garbled.

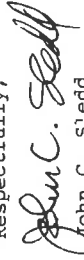
27. The EIS is correct in noting that the likelihood and timing of any railroad construction in the area is a

factor to be considered in the decision to lease federal coal. See p. 4-114, response to comment 13.1. This statement by the BLM, however, undermines the BLM's decision to simply assume that the Star Lake Railroad would be built and available to transport the leased coal. The entire discussion of the Star Lake Railroad contained on this page should be transferred to the body of the EIS, where it can be more readily considered by the decision-maker. It should also be expanded in order to elaborate on the present status of the railroad.

48.25

Again, we thank you very much for the opportunity to comment on the new Draft EIS.

Respectfully,


John C. Sledd
Attorney-at-Law

28. The EIS states that market conditions will determine when, where, and to what extent coal is developed. P. 4-127, response to comment 14.34. This statement establishes that BLM is ignoring Congressional policy as expressed in the Coal Leasing Amendments Act of 1975. BLM apparently proposes to lease coal without a close consideration of the need for immediate development. Under this scheme, if there is no immediate demand for development, the leases will presumably be forfeited for lack of compliance with due diligence requirements. The intent of the CLAA, however, was to encourage BLM to restrict leasing to that amount of coal which can be promptly developed, not to permit leasing as had existed prior to the CLAA, and then have leases forfeited. The BLM's proposal will lead to gross inefficiencies in the coal management program. To avoid these, the BLM should determine what tracts can be expected to be developed promptly, and should lease only that amount of coal which can realistically be expected to be developed.

48.26

29. BLM also continues to ignore the vital question of whether sufficient water is available for the proposed developments. Although final jurisdiction for this determination may lie with the State Engineer or the Navajo Nation, BLM's continued failure to address the question will likely lead to leasing of areas for which water will be unavailable, or available only at a prohibitive cost in terms of treatment or transportation. It is more efficient in the long run for BLM to obtain preliminary water availability data and to modify its leasing decisions in accordance with that data.

In conclusion, it is sincerely hoped that the Bureau will take advantage of the additional mitigation measures, lease stipulations, and other information in the new EIS, and use them to design and implement a more sensible, sensitive, and moderate program of coal leasing in the San Juan Basin.

Responses to comment letter #48.

- 48.1 In the committed mitigation section, page 1-16, Cultural Resources states "Following intensive cultural resource inventory, sites will be evaluated and determinations of National Register eligibility will be made by the Office of Surface Mining in consultation with and concurrence of the BLM or BIA and the State Historic Preservation Officer." The data received will be analyzed as required by this stipulation. Monitoring will be part of the mitigation plan that is developed at mine as required in the cultural resource stipulations on page 1-17.
- 48.2 Mine permits are not issued on an experimental basis. Before mining will be allowed, each lessee will have to show that reclamation of the lands to its pre-mining productivity is economically and technically feasible. This requires the lessee to show how revegetation will be done and to submit studies and information showing that revegetation to a pre-mining level can be successful on a particular lease. Extensive bonding is required and not released until reclamation success is proven. The lessee does not have to show absolute certainty of success, but must show that success is likely.
- 48.3 There was no intention of implying that costs of acquiring soil and reclamation data would change with time or the process stage. Data will be collected for only those tracts that are offered, sold, leased, and a mine plan prepared. To collect soil and reclamation data on all tracts at this time would be a waste of time and money.
- 48.4 No treatment to improve water quality from deep wells is currently being considered. Initial experiments indicate that saline water can be used for irrigating native species in reclamation projects (Weiler 1982).
- 48.5 At the time this section of the EIS was being written, the Star Lake Railroad did have Interstate Commerce Commission (ICC) certification in addition to their right-of-way grant. Sometime during the final editing process it was learned that because of court action, the ICC certification was revoked on March 3, 1983.
- Presently the Star Lake Railroad is Federally approved with concurrence from ICC.
- 48.6 The two persons per vehicle figure was professional judgment based on travel distances to the nearest residential communities and the economics of highway vehicle transportation as it is today.
- 48.7 The shortcomings of the paleontological stipulations in the standard lease form are recognized. The BLM is endeavoring to establish procedures and guidelines for protecting paleontological resources. A positive step toward this end would be an indication from the concerned agencies including the Navajo Tribe, that they would be willing to participate in this cooperative effort to preserve a natural heritage for all Americans.

- 48.8 The value of 30 ug/m^3 is obtained from the measured data from the New Mexico Environmental Improvement Division's monitoring station near Zuni New Mexico. Since data are not available at the proposed lease sites, this value has been applied to the EIS region. The 7 ug/m^3 is a calculated value using the estimated visual range calculated by the National Park Service at Chaco Canyon. The use of 7 ug/m^3 would result in fewer potential exceedances of the standards.
- 48.9 This measure is included to acknowledge that site-specific mitigation measures will be developed for a lease at the time of leasing to provide for protection to Chaco Canyon NHP.
- 48.10 The alternative mitigation measure is not intended to prohibit supplemental irrigation, but rather to enhance the success of revegetation. See the responses to comments 48.4 and 41.11.
- 48.11 Potential reduction in flow of springs in the Chuska Mountains is mentioned on page 3-12 Second Draft San Juan River Regional Coal EIS. The text is revised to add this section to Appendix B-11.
- 48.12 See the responses to comments 41.13, 41.14, 41.16, and 41.17.
- 48.13 Although some Alternative Mitigating Measures for relocation are listed on pages 3-90 through 3-92, specific relocation measures cannot be developed until specific mining operation plans are developed. Specific relocation measures will be analyzed and discussed thoroughly in an environmental analyses that must be prepared for each mining operation plan.
- 48.14 See the discussion on "Indian Relocation" at the beginning of the comment and response section in Chapter 4. Also mitigating measures have been developed to address this issue in the Alternative Mitigating Measures section in Chapter 3 of this document which basically deals with unauthorized occupants. Occupants on PRMAs have full negotiating rights for resettlement and will be justly compensated.
- 48.15 See the text change on page 3-84.
- 48.16 See the responses to comments 41.14 and 41.16.

- 43.17 As indicated on page I-6 in Appendix I Special Stipulations state that an area 100 feet surrounding each grave site which may be disclosed by the survey is considered unsuitable for surface coal mining unless the lessee lawfully relocated the grave site(s) (clarification added). Therefore, grave sites are protected under Unsuitability Criterion 3.
- State law requires permission from the family before a grave site can be disturbed.
- 43.18 These unauthorized occupants are located on public domain (lands under BLM administrative jurisdiction) without permission. The BLM has proposed that these occupants are not afforded protection under unsuitability Criterion 3, because their residence is not authorized under legally recognized methods, and has therefore, approved mining on those areas.
- If the residents are located on BIA administered lands, the BIA will be consulted and have concurrence. Refer also to the alternative mitigating measures. A study group (including BIA) will be formed to develop the stipulation that will be attached to each lease.
- 43.19 It is assumed that current and projected mines under permit or contract commitments, including those under lease from the Navajo Nation, would remain in production to honor legal obligations. Any expansion of existing mines would be at the discretion of the company holding the lease and the need to meet contract commitments. New production would be based on market conditions and contract agreements and not to the detriment of existing and permitted operations.
- 43.20 Crownpoint is different from Decker, Montana and Buffalo, Wyoming in that Crownpoint is influenced by policies and procedures of a Federal agency (BIA). Therefore, Crownpoint is less desirable as a place of residence to any mine employees from outside the community than other areas where newcomers or semi-transient residents may have more community influence and involvement.
- 43.21 Wage and payroll figures were not calculated as personal income or analyzed in this document since this EIS is based on regional economic analysis. However, regional income changes are estimated on employment (numbers of jobs) and average wage rates (approximately \$20,000) were used for direct mining jobs. Approximately \$19,000 was used to calculate wage rates which were indirectly related to mining.
- 43.22 The EIS does state that the coal development could soften the "bust" side of the cycle in the uranium and oil and gas development. Beyond that, no statement is made as to when the coal development may "bust" nor whether or not that "bust" may coincide with another "bust" in uranium and oil and gas. History would support that these cycles occur but their frequency and timing relate to many other factors. Thus it is impossible to predict when "boom" and "bust" cycles for different energy resources will coincide.
- 43.23 See the response to comment 14.1.
- 43.24 The text has been revised.
- 43.25 The response to comment 13.1 does not undermine the BLM's decisions to assume that a railroad would be built and available for coal transportation. We have merely pointed out that construction of the railroad is one of many factors that will determine the timing and the level of coal production in the San Juan Basin. For the purposes of this EIS and in order to analyze the impacts of each alternative level of coal leasing, a means of transportation was necessary. The decision makers are well aware of the dependency of the railroad for actual coal production. However, the construction of the railroad plays a much lesser role in the determination of the actual level of coal leasing. Leasing coal needs to occur before the railroad is built.
- 43.26 See the response to comment 8.4.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VI
INTERFIRST TWO BUILDING, 1201 ELM STREET
DALLAS, TEXAS 75270

NOV 15 1983

Charles W. Luscher
State Director
Bureau of Land Management
New Mexico State Office
P.O. Box 1449
Santa Fe, New Mexico 87501

Dear Mr. Luscher:

We have completed our review of the Second Draft Environmental Impact Statement (EIS) entitled "San Juan Regional Coal" prepared for the proposed competitive leasing of mineable Federal in-place coal reserves within McKinley, Valencia, and Sandoval Counties, New Mexico.

The following comments are offered for consideration.

We are pleased to know your agency has decided to select the Minimum Surface Owners Conflicts Alternative (MSOC) as the preferred alternative leasing action. This alternative had been previously recommended by Region 6 through comments offered on the original Draft document. We continue to recognize the MSOC leasing level as a reasonable choice in view of the related impacts associated with the No Action plan; and believe it will provide optimum conditions for environmental protection while allowing sufficient levels of the known Federal in-place coal reserves to be made available for future development in the San Juan River Basin.

Additionally, we understand and recognize that the ultimate development of the coal tracts within this specific coal region is and will continue to be subject to the uncertainties of actual coal demand, the economic market, and the acceptability of the applied mining technologies. Because of these uncertainties, we believe that actual development of site specific coal lease tracts will be best determined upon completion and evaluation of the subsequent mine and reclamation plans to be developed. Review and evaluation of these plans by appropriate Federal and State agencies, as required by existing Federal and State coal management regulations, should insure that the best available mining techniques, pollution control, and monitoring programs will be required and implemented through the development and execution of appropriate stipulations of the required mining permits to be issued for each site specific operation.

-2-

For these reasons, we consider your proposed leasing alternative as a tiered planning process requiring staged programmatic analysis on a regional and generic basis at this planning stage; followed by more detailed site specific analysis occurring within the mine plan development stage. We believe this document satisfies the tiering process as identified and encouraged by the Council on Environmental Quality. The Final EIS will be most useful for the required site specific in-depth environmental impact assessment, decision making, and permit issuance activities to occur within the mine plan development stage.

We classify your Draft EIS as LO-1. Specifically, we have no objection to the selection of the Minimum Surface Owners Conflicts Alternative as the preferred competitive coal leasing alternative. The statement contained sufficient information at this planning stage to generically evaluate the possible environmental impacts. We recognize this EIS as a programmatic document requiring further tiering activity as appropriate. Our classification will be published in the Federal Register in accordance with our responsibility to inform the public of our views on Federal actions under Section 309 of the Clean Air Act.

Definitions of the categories are provided on the enclosure. Our procedure is to categorize the EIS on both the environmental consequences of the Federal Action and on the adequacy of the EIS at the draft stage, whenever possible.

We appreciate the opportunity to review the Draft EIS. Please send our office five copies of the Final Statement at the same time it is sent to the Office of Federal Activities, U.S. Environmental Protection Agency, Washington, D.C.

Sincerely yours,

Myron O. Kinslow
for
Dick Whittington, P.E.
Regional Administrator

Enclosure

ENVIRONMENTAL IMPACT OF THE ACTION

LO - Lack of Objections

EPA has no objections to the proposed action as described in the draft impact statement; or suggests only minor changes in the proposed action.

ER - Environmental Reservations

EPA has reservations concerning the environmental effects of certain aspects of the proposed action. EPA believes that further study of suggested alternatives or modifications is required and has asked the originating Federal agency to re-assess these aspects.

EU - Environmentally Unsatisfactory

EPA believes that the proposed action is unsatisfactory because of its potentially harmful effect on the environment. Furthermore, the Agency believes that the potential safeguards which might be utilized may not adequately protect the environment from hazards arising from this action. The Agency recommends that alternatives to the action be analyzed further (including the possibility of no action at all).

ADEQUACY OF THE IMPACT STATEMENT

Category 1 - Adequate

The draft impact statement adequately sets forth the environmental impact of the proposed project or action as well as alternatives reasonably available to the project or action.

Category 2 - Insufficient Information

EPA believes the draft impact statement does not contain sufficient information to assess fully the environmental impact of the proposed project or action. However, from the information submitted, the Agency is able to make a preliminary determination of the impact on the environment. EPA has requested that the originator provide the information that was not included in the draft statement.

Category 3 - Inadequate

EPA believes that the draft impact statement does not adequately assess the environmental impact of the proposed project or action, or that the statement inadequately analyzes reasonably available alternatives. The Agency has requested more information and analysis concerning the potential environmental hazards and has asked that substantial revision be made to the impact statement. If a draft statement is assigned a Category 3, no rating will be made of the project or action, since a basis does not generally exist on which to make a determination.

50

TAOS ENVIRONMENTAL ASSOCIATION

P.O. Box 6040

Taos,

New Mexico 87571



November 16, 1983

Dear Mr. Luscher,

With regret, we must preface Taos Environmental Association's comments on the second SJRRGDEIS with the following remarks:

We found it physically impossible to present our oral comments on the DEIS in Farmington on November 8th. A full carload of participants from Taos was scheduled to leave here at 2: p.m. in order to testify at the 7: p.m. hearing. However, at 1:30 p.m., the day's impending storm blew down on Taos from the west and we realized we ought to consult with the State Police as to road conditions. We were told that the pass we needed to take between Tres Piedras and Chama was snow-covered and icy, with conditions worsening. We, of course, cancelled our participation in the hearing at the last moment.

This occurrence underscores the extreme inconvenience of the Department of Interior's insistence that only one hearing be held far distant from the centers of active scrutiny of San Juan Basin coal development planning. This radical deviation from previous State BLM procedures to facilitate public participation is distressing. Without the requests granted for additional hearings on the Navajo Eastern Agency, in Albuquerque, Santa Fe, and Taos, or in any of the above places, we must conclude that "someone upstairs," most likely Garrey Carruthers, is now dictating BLM's procedures at the expense of a true public consultation process, as required by NEPA and FLPMA.

That issue aside, BLM has again, in this DEIS, failed to determine whether one ounce of coal is needed to be mined within the next 20 years. Therefore, "Need for Leasing in the Region" is a sham.

BLM refuses to exercise its power (granted by virtue of NRDC v. Berkland) to control development of the PRLAs by writing strong lease stipulations. Exchange or legislation is not needed to prevent granting PRLAs. They can simply be denied through stipulations that make recovery not profitable. Who needs another 1.75 billion tons of recoverable reserves on the glutted market, anyway?

Table 1-1 is still essentially the same, is still unreferenced, and is still unsupportable. The old Federal Coal Management Program EIS coal goals, and "consultation with state and federal agencies" (1-4) are still given as the basis for the need for leasing. None of these sources support the need for leasing; what supports the need for leasing is dishonest calculations by BLM, described in detail by EDF on p. 104 to 109 of the Final Cumulative Overview.

Subalternative I, Alternative Lease Terms, is a list of "Alternative Mitigation Measures" (p. 3-84 and ff.) which are lease stipulations which BLM has decided NOT to implement. The REAL lease terms

in Appendix I give no answer to the questions we have raised about relocation: Where will people be relocated? For how long? Who pays? Who decides? BLM is also including "alternative lease terms" for consideration that BLM itself is not considering! For example, BLM's press release for the Second Draft says that BLM is considering Navajo pre-role to require Navajo preference, and said so shortly before the second draft was released.

The land use plan should have been a Resource Management Plan complying with FLPMA's requirements for ACEC designation and protest procedure, and should have completed unsuitability assessment and surface owner consultation. An assessment still needs to be done during land-use planning of where and whether reclamation is technically and economically feasible as provided by the Surface Mining Control and Reclamation Act. And how will mining and water supply procurement for mining affect existing water users? What offsite wells will be affected? Will irrigation be required for reclamation?

Obviously, this second SJRRGDEIS is inadequate and it is deceitful to represent it as a sincere attempt to "go back to the public" for meaningful dialogue. Admit that it is folly to lease another 3 billion tons of unneeded coal, and then the BLM will be on strong footing on firm ground.

Enclosed are petitions from Taosños opposing BLM's proposed coal leasing, both PRLAs and competitive, totalling 192 signatures. Please include these expressions of concern in your compilation of public comments.

Thank you,

Kathryn Albrecht

Kathryn Albrecht

Taos Environmental Assn.

Responses to comment letter #50.

50.1 A detailed assessment of mining impacts and reclamation requirements is made for each tract. The surface mine and reclamation plan is based on permanent program performance standards for surface mining (30 CFR 816) and must be submitted to and approved by the State of New Mexico's Mining and Minerals Division, New Mexico Energy and Minerals Department in cooperation with the Federal Office of Surface Mining (OSM). A site-specific environmental analysis of the mine plan will be prepared by the OSM. The State of New Mexico will then issue a permit to mine, but only if the lessee can show that reclamation is economically and technologically feasible on the specific tract proposed for mining.

50.2 The impacts to water supplies from the development of PRLAs and competitive coal leasing are identified and analyzed in general terms in the Second Draft San Juan River Regional Coal EIS. Also see the response to the comment 31.9. Irrigation for reclamation may or may not be required depending on rainfall, site-specific soils, and the species used for revegetation. Species seeded usually include a variety of plants that are native to the area.

State Director
Bureau of Land Management
Caller Service 4104
Farmington, New Mexico 87401

November 16, 1983

Dear Sir,

Enclosed are comments of the Environmental Defense Fund on the Second Draft San Juan River Regional Coal Environmental Impact Statement.

Sincerely,

David Marcus
David Marcus
Economic Analyst

Enclosure

DM:dm

COMMENTS ON THE

SAN JUAN RIVER REGIONAL

SECOND DRAFT

ENVIRONMENTAL IMPACT STATEMENT

A. Introduction

The San Juan River Region Second Draft Environmental Impact Statement (DEIS) examines six different leasing levels for federally owned coal in northwest New Mexico. The amounts of coal to be leased range from zero in the No Action alternative to approximately 3.34 billion tons in the High alternative (DEIS, pp. xiv, xxi). The preferred option consists of issuing all 26 New Mexico Preference Right Lease Applications (PRLAs), and also leasing 11 new tracts by competitive bidding, for a total of over 2.3 billion tons of newly leased Federal coal (DEIS, pp. xiv, xix).

The Environmental Defense Fund (EDF) has previously commented on BLM's coal leasing plans for the San Juan Basin. In our review of the November 1982 first DEIS, we showed that BLM's stated goals of satisfying "anticipated coal demand in the region" and helping to ensure "that Federal coal is available to meet the country's energy needs" could be met without leasing any additional leasing. EDF stated at that time that coal demand for the next decade could be met solely from existing mines and leases (EDF, "Coal Development Proposals in New Mexico: An Economic and Technical Analysis," April 1983, pp. II-1, II-2).

Nothing in the second DEIS changes EDF's conclusions from last April. While the BLM has responded to EDF's extensive comments by changing its text in many places (see DEIS, pp. 4-37, 4-38, 4-39, 4-40, 4-41, 4-42, 4-43, 4-105, 4-122, 4-132, 4-149), it has not responded to the key EDF point that coal production is a response to the demand for coal, not to leasing. The BLM

continues to assume that more leasing leads to more production (see, e.g., DEIS, p. 1-5).

Perhaps even more egregious than ignoring the role of demand in coal production, the BLM appears to have adopted a policy of systematically changing the data where it doesn't like it, and ignoring it when it thinks no one will notice. The PRLAs, described in past BLM documents as containing 2.2 billion tons of reserves, have shrunk to 1.4 billion tons. The BLM refuses to show to the public the most authoritative source of information on the size of the PRLAs, the final showings by companies as to the economic viability of the PRLAs. Miraculously enough, the BLM's figures as to PRLA production are unchanged by the change in the reserve. Existing mines and leases, which the BLM originally ignored except for one table (DEIS, p. 1-5), were the subjects of an extensive EDF review which documented a production capacity by 1995 of over 55 million tons per year (EDF, ~~op. cit.~~, p. II-67). Now the BLM has added a brief discussion which still omits some existing mines, and shows production of only about 30 million tons in 1995, unchanged from its previous figure. The BLM has obviously not done any new calculations; it has added some words, reprinted its old table, and continued to implicitly assume that new leases will be produced at the same time that existing leases will be producing at barely half their capacity.

The BLM states that it wishes to issue competitive leases for tracts containing 800-900 million tons of Federal coal, "subject to identification of those tracts with the least social, environmental, and economic costs," to "ensure that Federal coal is available to aid in satisfying anticipated coal demand," to

"ensure competition among coal producers", and "to meet the country's energy needs" (DEIS, pp. 1-1, 1-2). Meeting the country's energy needs in this context means meeting coal demand, and BLM betrays the emptiness of its words by never once in the DEIS saying what level of coal demand it thinks needs to be met. The last time a Federal agency calculated coal demand for the San Juan Basin, in the Carter Administration, its calculations included demand for coal in the 1980's to supply synfuels plants in New Mexico. Is the BLM still using those outdated forecasts? Is it using any forecasts at all? EDF's April 1983 comments addressed the subject of coal demand in New Mexico, and showed that there was no need to lease coal in order to "satisfy anticipated coal demand." The DEIS ignores the analysis by EDF, offers no analysis of its own, and just repeats its baseless catch-phrase about meeting the country's energy needs.

Insuring competition among coal companies is a new BLM goal, lacking in the previous San Juan Basin DEIS. But again the BLM has found a euphonious catch-phrase that bears no relation to its actual proposal. As EDF has already pointed out in its prior comments, most of the tracts the BLM proposes to lease are, for one reason or another, tracts whose winning bidder can be confidently predicted in advance. The PRLA tracts are by law restricted to specific companies. So where is the competition, if the matchups of companies to tracts have all been decided in advance? Perhaps BLM means that after leasing, companies will compete against each other, with only some tracts entering production? But in that case, all of BLM's arguments about the need for leasing are patently false, and all its analysis which

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assumes that every tract leased will enter production is also false. Again, the EDF comments of April 1983 addressed in detail the fact that BLM's Table 1-1 (DEIS, p. 1-5), showing production levels independent of leasing levels, contradicts the notion that competition will exist.

Finally, there is the stated BLM goal of identifying those tracts with the least social, environmental and economic costs. The BLM offers no analysis whatsoever as to the relative economic costs of different tracts, and indeed has refused to make such information public for the PRLAs.

Its proposed lease tracts for competitive bidding include a very large underground tract (Nageezi) with no rail access. Is this really an economic tract? Based on what analysis?

As for environmental costs, the BLM proposes to lease PRLAs underlying two different Wilderness Study Areas (WSAs), with the tracts at the Ah-Shi-Sle-Pah WSA to be strip-mined. Is strip-mining could-be wilderness BLM's idea of considering environmental factors?

The primary "social factor" in the San Juan Basin is the historic and continuing fact that the land is occupied by and used by members of the Navajo Nation. Individual Navajos, local Navajo Chapters, and the Navajo Nation itself have all opposed portions of the proposed granting of PRLAs and competitive lease sale. They have successfully forced the reconsideration by the Interstate Commerce Commission of the permit for the initial portion of the Sta. Lake Railroad, and have argued before the ICC that the Star Lake Railroad and associated coal development would harm their interests. The BLM has not responded, as it could have, by agreeing to Navajo

requests to defer new leasing. It has not acceded to Navajo requests to grant the Navajo Nation status as a surface owner. It has not acted on the Navajo Nation's delineation of acreage in New Mexico which it wishes to acquire as part of its entitlement under legislation partitioning the Navajo-Hopi Joint Use Area in Arizona. It has not even added any discussion to its DEIS explaining why leasing all 26 PRLAs and the particular 11 competitive lease tracts would be preferable to some other action from a social point of view.

In simple fact, the BLM's language about considering social, environmental, and economic costs is just that: language. EDF feels that the DEIS is inadequate on its face, designed to legalize pre-made decisions. The DEIS is without any factual support for leasing based on its own stated criteria. Attached below are some specific comments pointing out places where BLM has fudged its numbers, omitted contradictory data which it possesses, or simply failed to address key questions. Since the bulk of the DEIS is unchanged from the November 1982 draft, the reader is referred to the EDF comments of April 1983 for a fuller discussion of the policy inadequacies of BLM's proposed coal leasing program.

B. Specific comments on the second DEIS

1. PRLA production

In the first draft EIS, the BLM implicitly assumed lifetime production from all PRLAs of some 682 million tons. This figure is the BLM's own, and was obtained directly from Mr. Kent

Hamilton, a senior BLM employee. It was cited in EDF's previous comments. EDF has a copy of Mr. Hamilton's worksheet showing the derivation of the 682 million ton figure from mine-by-mine, year-by-year fully disaggregated data. The BLM nevertheless has the temerity to pretend its own data do not exist, with the second DEIS now claiming that the PRLAs contain 1.15 billion tons of recoverable coal (DEIS, p. 1-6). If the PRLAs really contained 1.15 billion tons of recoverable coal, and were developed and mined over a 35-year period as shown by the BLM (DEIS, p. 1-7), the average annual production from PRLAs would be 32.9 million tons. But the BLM shows maximum production in the year 2000 (DEIS, p. 4-36) of 20.5 million tons (DEIS, p. 1-8). The BLM tries to weasel out of the contradiction between its production rate figures and its recoverable reserve figures by asserting that "total PRLA recoverable reserves cannot be directly determined from the total annual PRLA production rate...." But it is clearly impossible to produce a maximum of 20.5 million tons per year (DEIS, pp. 1-8, 4-36) for a maximum of 35 (DEIS, p. 1-7) to 40 (DEIS, p. 1-8) years, and end up with 1.15 billion tons of recovered coal.

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The importance of the BLM's numerical swindles with PRLA production rates are that they result in serious misstatements of the land use, employment and air quality impacts of the PRLA option. If impacts are calculated from data for 7 groupings of PRLA's (as shown in Mr. Hamilton's work papers and in the DEIS, p. 1-7) with production rates totalling 20.5 million tons per year, then those calculated impacts will drastically understate

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the real impacts which would result from full development of the PRLAs. Perhaps more importantly, if the BLM claims actual production will be constrained to no more than 20.5 million tons per year for 35 years, as shown in Mr. Hamilton's workpapers and implied by the DEIS, pp. 1-7 (PRLA lifetime), 1-8 (20.5 million tons per year in 1995 and 2000), and 4-36 (production maximum occurs in 2000), then the coal companies have been lying to the BLM and the PRLAs should not be issued. Issuance of a PRLA is contingent upon a showing by the coal company that commercial quantities of coal exist, among other factors. The initial showings made by the coal companies to BLM, as reported in the Environmental Assessments for the PRLAs, showed production levels of about 35 million tons per year. The BLM has refused to make public the final showings by the companies, but there is no reason to think that those figures have been revised. If they have not, and the companies are still claiming production of 36 million tons per year while BLM believes only 20.5 will occur, then clearly BLM believes that at least some PRLA final showings are faulty. The EIS should discuss which PRLAs cannot produce at the levels claimed by the coal companies, and the resulting options available to BLM, including denial of the PRLA on the grounds that an accurate showing of the existence of commercial quantities of coal has not been made.

2. PRLA coal reserves

The section above discussed contradictions in the BLM numbers for PRLA production levels. Equivalent discrepancies in the data occur when discussing the overall level of PRLA coal reserves, both total reserves and recoverable reserves. The DEIS

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says that recoverable reserves are 1.15 billion tons (DEIS, p. 1-6). The companies' initial showing information said that recoverable PRLA reserves were 1404 million tons (Final EA on PRLAs, p. 156). The BLM earlier estimated recoverable PRLA coal at over 1.87 billion tons (Draft EA on PRLAs, p. 2-5). The Final EIS on the Federal Coal Management Program estimates recoverable PRLA coal in the San Juan Basin at 1.5 billion tons (see Final EA for PRLAs, p. 77). If BLM has data to indicate that its own prior documents are wrong, and that the companies are wrong, it has not made that data available to the public. Even if the BLM's 1.15 billion ton figure is correct, that figure still is far above the 682 million ton figure actually used by the BLM in calculating impacts in both the first and second DEISs, as discussed in B.1 above.

As for the total level of PRLA reserves, the same BLM practice of downgrading can be observed. The DEIS says there are 1.4 billion tons of in-place PRLA coal (DEIS, p. 1-8). The first draft of the DEIS talked about "2.2 billion tons of Federal coal on 26 existing PRLAs" (first DEIS, p. viii). The state director of the New Mexico BLM, writing to his boss, said there are 2 billion tons (Luscher to Burford, 2/16/81, "Preliminary Feasibility Leasing Target Report," pp. 2,7). The BLM's handout to the public at its public meeting on the leasing "Goals and Targets" for the San Juan Basin said 2 billion tons. When did

the PRLAs shrink? Where is the publicly reviewable documentation that all the BLM's previous figures for the amount of coal underlying PRLA's were overstated by up to 50 percent? How can

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51.9 the BLM make a commercial quantities finding, as required for PRLA issuance, if the resource base itself is so uncertain?

3. Production of coal from existing mines and leases

The DEIS lists expected recovery of coal from existing mines and leases as 600 million tons, based on total reserves of 800 million tons (DEIS, p. 1-4). The 600 million ton figure is for the aggregate production of ten specific mines (DEIS, p. 1-4), but no documentation is given as to the derivation of the figure, and it is not broken down on a mine-by-mine basis. There is no evidence that the BLM ever looked at the year-by-year, mine-by-mine data compiled by EDF and previously submitted to BLM (EDF comments on first DEIS, p. II-67). EDF's data, based on mining companies' own mine plans or existing production, show recoverable reserves from existing mines and existing leases with filed mine plans of about twice the BLM figure. The mine plans for just the Burnham, Navajo, and Star Lake mines show recoverable coal reserves of 631 million tons (this excludes pre-1984 production from Navajo and Burnham, which are already operating). The BLM shows recoverable reserves from all existing mines and leases in the San Juan River Region of only 600 million tons. How does the BLM explain its refusal to use company mine plan data for future production from existing mines and leases? If the answer is that the BLM thinks the mine plans are too optimistic, it is the basis for that opinion? What is the basis for the BLM's lower numbers? Has the BLM applied a similar skepticism when reviewing the companies' PRLA final showings?

51.11 The BLM has ignored company data for production rates as well

as reserves at existing mines and leases. The BLM asserts that coal production in 1987 from existing mines and leases will be 39.4 million tons, dropping to 26.5 million tons per year by the year 2000 (DEIS, p.1-4). No documentation is given for these quite precise estimates, which are unchanged from the first DEIS (first DEIS, p. 1-4). When EDF tried to find out the source of these numbers in the first DEIS, it was told that no mine-specific data was used to calculate them (EDF comments on first DEIS, p. II-57). The BLM has made mine-specific production estimates, but those estimates showed much higher production levels than the DEIS (EDF comments on first DEIS, pp. 2-18, 2-19). EDF points out that the original DEIS production figures for existing mines and leases referred only to "leased federal coal" (first DEIS, p. 1-4), while the new DEIS lists non-federal mines such as McKinley. BLM apparently thinks it can change the definitions without changing the numbers.

Even on its own terms, the new DEIS is patently false in its production estimates for existing mines and leases. Its list of mines neglects to mention the Bisti, Carbon#2, Gallo Wash, Gateway, La Plata, La Ventana, South Hoshpah, or Star Lake mines. All are existing leases, all have filed mine plans (Gateway is operating), and all were included in EDF's previous comments to the BLM. The mine plans for existing mines and leases, as tabulated by EDF (EDF comments on first DEIS, p. II-67), show 1995 production capacity of 47.3 million tons per year, and continuous increases from 1983 through 1996 (the last year shown). This figure, 47.3 million tons per year, comes from company data and is far above the 30 million tons shown by BLM

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51.12 for the same year (DEIS, p. 1-5). It is based on the same rail access assumption used by the BLM (Star Lake Railroad by 1987; see BLM, DEIS, p. 3-2, and EDF, comments on the first DEIS, p. II-67). It is based on the same marketability assumption as BLM (production not constrained by demand; see BLM, DEIS, p. 3-2, and EDF, comments on the first DEIS, p. II-67). Moreover, EDF's numbers are based on peak production from the Burnham mine of 6.4 million tons per year (loc. cit.). The BLM's sister agency in the Department of the Interior, the Bureau of Indian Affairs, estimates that production from the Burnham mine will actually rise to 9.7 million tons per year by the year 2000 (BIA, Final ES for the Navajo Railroad Project, February 1983, p. 1).

The importance of BLM's gross understatement of production capacity from existing mines and leases is simple. Existing mines and leases can meet the demand for coal from the San Juan River Region at least until 1995, but saying so would undercut the basis for leasing in 1984. By listing already leased reserves at perhaps half of their actual level, and showing production from existing mines and leases steadily lower in 1990, 1995, and 2000, the BLM tries to strengthen the case for new leasing.

The BLM has no problem showing the results of new leasing as if every tract entered production (see DEIS, p. 1-5, where the more coal leased, the higher the production level). It does not think the level of production from existing mines and leases is affected by the level of future leasing (again, see DEIS, p. 1-5, where the "production from other sources" category is the same in every alternative).

So if market factors, whether competition

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from other producers or demand for coal, do not affect production, how can the BLM justify ignoring company projections of their own future coal production? The BLM is simply using artificially low numbers, without regard to extensive documentation by EDP of their inaccuracy, in order to disguise the absolute lack of need for additional leasing of federal coal in the San Juan River coal region.

4. Production rates from various alternative leasing levels.

The BLM shows the level of production in various years that would result from different levels of coal leasing in 1984 (DEIS, p. 1-5). These values are unchanged from the first DEIS (cf. first DEIS, p. 1-6). But as the BLM well knows, the production figures for the leasing alternatives shown in the first DEIS correspond to the totals from the year-by-year, tract-by-tract data compiled by the BLM's Mr. Hamilton. And those year-by-year estimates, which the BLM has never published, show peak production from the various leasing alternatives occurring after the year 2000, often after 2010. Now the BLM asserts that

"it is felt that a general tapering off of production and impacts will start to occur after 2000" (DEIS, p. 4-38). Ignoring the passive tense (by whom is it "felt"? Not Mr. Hamilton, at least), the truth is that BLM's quantitative estimates do not show production tapering off after 2000. Production in many later years exceeds the level in the year 2000, and for every alternative the peak year occurs after 2000. This BLM misrepresentation of its own data was previously challenged, and saying a falsehood twice does not make it true.

The importance of BLM's failure to acknowledge its own data is principally that it results in the DEIS greatly overstating the value of a 1984 lease sale. The figures underlying the first DEIS were based on numerous tracts entering production more than 10 years after leasing, and the cumulative production figures in the current DEIS are unchanged from the first DEIS. But obviously there is no need to lease in 1984 tracts which will not even begin production until the year 2000, and whose peak production will occur in the 21st century.

The BLM has tried to obscure the implicit violation of at least the spirit, if not the letter, of the due diligence clause, by never admitting that its summary data are in fact based on tract-specific data with tract-specific start-up dates as late as the year 2020. The BLM now claims that, contrary to its first DEIS, "Development of Hospah (#1 and #2), Gallo Wash #2, and other tracts with adjacent operations would occur prior to 1993" (DEIS, p. 4-41). Since just the three named tracts are projected by BLM to have an annual production of 14.2 million tons (DEIS, pp. A-10, A-18, A-20), the BLM's statement would, if true, substantially change the overall production levels shown for 1995 and 2000 for alternatives containing those three tracts. In fact the production levels are not changed in the new DEIS for any alternative (see DEIS, p. 1-5, and first DEIS, p. 1-6), proving the falsehood of BLM's claim that it has assumed pre-1994 start-up of mining at Hospah and Gallo Wash.

An additional problem resulting from BLM's false assertion that it expects production to decline after 2000 is that the EIS never shows the maximum impacts of the various alternatives.

Royalties and employment, considered benefits, are given for the life of the mine (DEIS, Appendix A). But some impacts, such as traffic and population growth, are given only through the year 2000, before they will have reached their peak (DEIS, p. 1-40).

5. Non-responsiveness to comments

EDF could comment at great length about both general and page-by-page inaccuracies and omissions in the EIS, as it did in its 67 pages of comments on the first DEIS, since virtually all of the major objections made to the first DEIS still apply to the second. But the BLM has clearly adopted a policy of not responding directly to embarrassing substantive comments, at least in EDF's case. Therefore, EDF has merely reviewed its own comments on the original DEIS (reprinted in tiny print on pp. CL-89 through CL-120 of the BLM's "Final San Juan Basin Cumulative Overview and Comment Letters," September 1983) and compared its previous comments to the new DEIS. The section below lists previous EDF comments to which BLM has either not responded or has responded indirectly (e.g., omitting the offending phrase without changing the underlying numerical data).

a. Section II.B.1, "Need for Leasing"

The DEIS addresses the need for leasing in less than one page of text (DEIS, pp. 1-1, 1-3). So did the first DEIS (first DEIS, pp. 1-1, 1-3). No changes have been made to reflect the existence, let alone the content, of EDF's original comments.

b. Section II.B.2, "The Star Lake Railroad"

EDF pointed out that the Star Lake Railroad did not have a valid right-of-way permit, since the permit for a portion of the proposed railroad which had been granted by the Interstate Commerce Commission (ICC) had been revoked after a court challenge. The ICC has not yet issued a new permit.

BLM has responded by claiming that "construction of any portion of the railroad and the time frame involved is entirely at the discretion of the Santa Fe Pacific Railroad," a totally

false statement which ignores Santa Fe's lack of a permit from the ICC.

c. Section II.B.4., "Due Diligence"

EDF pointed out that the unpublished Hamilton data which underlies the BLM's aggregated production data for competitive leasing alternatives, as well as the first DEIS itself, showed violations of the due diligence clause of the Federal Coal Leasing Amendments Act.

BLM's response to this criticism, as discussed in section B.4 above, is to claim it has changed its assumptions, without changing any of the conclusions allegedly based on those assumptions. Moreover, the DEIS continues to show 9 tracts with projected mine lives exceeding the statutory 40-year limit (DEIS, Appendix A).

d. Section II.B.5., "Economic Recovery"

EDF pointed out internal contradictions in BLM's data with respect to the requirement that coal from federal leases be produced so as to obtain "maximum economic recovery."

The BLM has neither responded to EDF's comments nor substantially changed any of its numbers regarding expected recovery (cf. first and second DEISs, p. 2-10 in each case).

e. Section II.B.6., "Fair Market Value"

EDF identified five different reasons why the proposed San Juan River Region competitive coal lease sale would be incapable of yielding fair market value as required by law (leasing into a national glut, leasing into a local glut, creating a glut prior to the lease sale, offering tracts tailored to specific bidders, and leasing with inadequate data). Since that time, events in the Fort Union lease sale have confirmed EDF's claims. In the Fort Union sale in North Dakota and Montana, no tract received more than one bid, and bids were at less than a penny per ton of coal reserves.

The BLM has responded by admitting in a preface that 7 of the 39 tracts currently lack enough data, even by BLM standards, to allow them to be leased. Nevertheless, all seven are still discussed in the DEIS, and one of them is in the proposed leasing alternative. The DEIS neither acknowledges EDF's comments regarding the other four problems leading to lack of fair market value, nor responds to them. There is no discussion of the problem of tailoring tracts to a single bidder, even though EDF specifically raised this issue with regard to the Lee Ranch and Nageezi tracts, which contain over 73 percent of the federal coal in BLM's preferred leasing alternative (see DEIS, p. 2-8).

f. EDF specific comment #1

EDF pointed out that the summary of PRLA impacts did not reflect the proposed strip-mining of a wilderness study area (WSA).

The corresponding section of the second DEIS now admits that there are three WSAs in the region to be affected by PRLA development, but still doesn't say that the Ah-Shi-Sle-Pah WSA would be directly strip-mined. Instead, the DEIS now says, in

apparent response to EDF and other commenters, "some individuals feel that their wilderness experience would be diminished" (DEIS, p. xv). Strip-mining a WSA doesn't just "diminish" a wilderness experience, it eliminates it!

g. EDF specific comment #5
EDF cited a letter by BLM New Mexico state director Luscher contradicting statements in the DEIS.

The BLM has neither changed the DEIS nor responded to EDF's comment.

h. EDF specific comment #9
EDF pointed out that in the Bypass Alternative, peak production would not occur when the first DEIS said it would.

The BLM has neither changed the DEIS nor responded to EDF's comment.

i. EDF specific comment #11
EDF pointed out that the first DEIS showed production from "other sources," which do not include PRLAs, lower in each succeeding graph from 1987 on (first DEIS, p. 1-6).

The BLM responding by inaccurately claiming EDF had misread the data (it did not), and did not change its graph or respond to EDF in any other way (see DEIS, p. 1-5).

j. EDF specific comments #s 21, 23, 25
EDF cited data obtained from the BLM to show that peak production would occur after the year 2000 in three different leasing alternatives (peak production occurs in the year 2025 in the alternative which is now the proposed action).

The BLM has not changed its text. It has not admitted that EDF was citing data obtained from the BLM itself. It has not responded in any way to EDF's comment except to say that it stands by its DEIS.

k. EDF specific comments #s 37, 38
EDF cited data obtained from the BLM to show that the production estimates in the DEIS for the Nageezi and Lee Ranch West tracts contradicted the aggregate production estimates for the leasing alternatives containing those two tracts.

The BLM has not changed either its reserve estimates for those tracts or its production estimates for leasing alternatives including them. Nor has it admitted that the internal contradiction pointed out by EDF continues to exist.

l. EDF comment #46
EDF's showed that the BLM's assumption that all leases will enter production is both implausible and does not lead to a "worst-case" analysis as claimed in the first DEIS.

The BLM responded by admitting that "the probability of this [development of all leased tracts] is low" (DEIS, p. 3-2), but did not change the assumption itself. Instead, the BLM simply took out its former claim that the assumption results in a worst-case analysis. But ignoring a problem does not make it go away. What is the point of analyzing a case which is neither likely nor

a worst case? Where is the BLM's worst case analysis? If the BLM believes it has done a worst-case analysis in the DEIS, then it should continue to say so, and should respond to EDF's comment. If the BLM has omitted the phrase "worst-case" just to eliminate a blunder in the first DEIS, then it has left itself with an analysis which is based on an admittedly improbable situation and no analysis of either likely or worst-case situations. To rub in the insult, the BLM never actually says in the DEIS how or where it has responded to EDF comment #46. Thus only a truly diligent student of BLM publications could discover EDF's comment (published in reduced type in the Cumulative Overview) and then learn by comparing the first and second DEISs that BLM's response was purely cosmetic.

m. EDF specific comment #48

EDF pointed out yet another instance of the BLM asserting peak production from leased tracts would occur in the year 2000.

The BLM, as elsewhere, neither changed its text nor reconciled the contradiction between the text and BLM's own year-by-year, tract-by-tract data.

n. EDF specific comment #49

EDF cited the BLM's own data, obtained from Mr. Hamilton, as well as the first DEIS itself, to show that many tracts have expected production start dates more than 10 years after leasing.

The BLM responded by adding a sentence which blandly asserts "production will begin no later than 1994..." for any tract (DEIS, p. 3-3). But the BLM has not changed any of the summary numbers in the DEIS (compare DEIS, p. 1-5 and first DEIS, p. 1-6). How can the BLM change the assumptions which underlie its figures without changing the figures themselves? What year does the BLM actually expect production to start for each of the competitive lease tracts?

o. EDF specific comment #50

This comment pointed out a contradiction between chapters 2 and 3 with respect to recovery rates for underground coal mines. The BLM has not changed its numbers, and the contradiction still exists. In chapter 3, the BLM states that underground recovery rates are 50 percent of the coal-in-place (DEIS p. 3-3). But in chapter 2, when the BLM lists total reserves and recoverable reserves for each tract, the facts differ. Of five underground tracts, which contain over 72 percent of the federal coal the BLM proposes to lease, only one is expected to have 50 percent recovery (DEIS, p. 2-8). The other 4 all have recovery rates of 26 percent or lower (DEIS, p. 2-8).

p. EDF specific comments #s 57-59, 61-62

EDF pointed out that various impacts in Colorado were not considered in the first DEIS.

The BLM has responded by admitting that the DEIS only covers northwest New Mexico (DEIS, p. 4-114). This is a truly incredible answer, since the document in question is a DEIS for the San Juan River coal region, which includes a portion of Colorado. There are both existing and proposed coal operations

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- 51.32 in the Colorado portion of the San Juan River coal region. The leasing targets set by the Secretary of Interior for the San Juan River Region purport to be based on documentation which addressed the demand for coal from the Colorado portion of the San Juan River region as well as prospective production of Colorado coal. If the BLM is going to restrict the DEIS to New Mexico, shouldn't the leasing targets for the San Juan River region also be reduced? Or has BLM made an administrative decision that all coal leasing in the San Juan River Region will occur in New Mexico? (Along this line, EDF points out that there have been calls for expressions of interest for future San Juan River region coal lease sales in the area south of the Zuni Reservation, an area which is also not addressed in any way in the DEIS. Would those lease sales be affected by the size of this one?)
- 51.33 q. EDF specific comments #68, 69
EDF criticized certain statements in the Cumulative Impact Summary section of the first DEIS.
The BLM has not responded directly to EDF's comments. Instead, the entire section (11 pages) has been deleted from the second DEIS.
- 51.34 r. EDF specific comment #74
EDF criticized the lack of any discounting of dollars in Appendix A-1, so that royalties are assumed the same in 1987 and in 2017.
The BLM has neither responded to this comment nor changed the text.
- 51.35 s. EDF specific comment #83
EDF pointed out that the stated total coal reserves for the Gamarco #1 tract were less than the recoverable reserves, an obvious impossibility.
While the error was not very large, BLM's response typifies the incredibly sloppy way in which the BLM has dealt with public comments on the first DEIS. The BLM responded to this comment, as it did to numerous comments by EDF and others, by stating only that "the text has been revised" (DEIS, p. 4-43). Thus BLM gave the impression of having responded to EDF's comment. But while the BLM did indeed change the text pointed out by EDF so as to eliminate one contradiction it left another one intact and created a contradiction which had not previously existed.
The new DEIS shows Gamarco #1 recoverable reserves of 1.9 million tons of federal coal (DEIS, p. A-43). This contradicts p. 2-9, unchanged from the first DEIS, which shows recoverable federal coal at Gamarco #1 of 3.0 million tons. In addition, throughout Appendix A-1, the BLM shows total (i.e., federal plus non-federal) recoverable coal tonnage, and the rate and duration over which it will be mined (e.g., the Hoshah #1 tract is shown with total recoverable reserves of 186 million tons, expected production of 10.3 million tons per year, and a projected mine life of 20 years (DEIS, p.A-18)). For Gamarco #1, the revised numbers in the second DEIS show total recoverable tonnage of 3.1 million tons (DEIS, p. A-43). But the numbers for production and
- 51.36 mine life, 95,000 tons per year and 22 years, are unchanged (DEIS, p. A-43, and first DEIS, also p. A-43). The trouble is that the old and new numbers are mutually contradictory, since production of 95,000 tons per year for 22 years would only lead to total production of 2.09 million tons, not the 3.1 million shown in the DEIS!
- t. Section II.D.4., "Mining Company Estimates of Coal Production Capacity in the San Juan River Region"
EDF summarized mining company production estimates for their own mines and leases, as well as for PMLAs.
The BLM neither acknowledges the existence of EDF's analysis, attempts to rebut it, nor explains the source of its own numbers. It should be pointed out that while the BLM claims its numbers for the "other sources" category are based on production at specific named mines (DEIS, p. 1-4), the totals are unchanged from the first DEIS. The BLM has previously informed EDF that no specific mine-by-mine data were used in calculating the production levels in the "no action" alternative shown in the first DEIS at p. 1-6 (see EDF specific comment #53, footnote 41).
- 51.366 C. Conclusions
While EDF has not reviewed the current DEIS at the same page-by-page level at which it analyzed the first one, several points are clear. Procedurally, the BLM has rearranged comments and its responses to them so that even commenters like EDF who numbered their page-specific comments can no longer find the responses. It has totally omitted responses to some comments, and responded only to portions of others. In some cases the BLM has deleted text from the DEIS so as to make the precise original comment moot without addressing the content of the comment.
Substantively, the BLM continues to ignore the question of need. When convenient, it assumes that leasing automatically leads to production. When inconvenient (as in its analysis of the existing leases which constitute much of the no action alternative), it ignores the production data in the mine plans of existing leases. Demand is never mentioned. The Star Lake

Responses to comment letter #51.

Railroad is assumed complete by 1987 despite its lack of an ICC permit and the fact that its permit application is being contested. The tracts proposed for leasing are never shown to be superior to other tracts on either environmental, economic (why lease primarily coal requiring underground mining?), or competitive grounds (why lease tracts which are either bypass tracts, have only one expression of interest, or have no expressions of interest at all?). The BLM excludes available detailed data from the DEIS, data used by its own staff in preparing the DEIS, because that data flatly contradicts numerous assertions made in the text of the DEIS.

The DEIS as it stands still retains the faults of its predecessor. EDF urges the BLM not to proceed with any leasing of federal coal in the San Juan River coal region until such time as it prepares a DEIS which fully considers the need for leasing, the likely rather than the unlikely consequences of leasing, and a realistic no action alternative which considers the most probable course of development in the San Juan River Region if additional federal coal is leased.

51.1 We used the forecast made by the Department of Energy in their report. "The 1990 Biennial Update of National and Regional Goals for 1985, 1990, and 1995, U.S. Department of Energy - Assistant Secretary for Resource Applications Leasing Policy Development Office December 1980." Also see the response to comment 8.4.

51.2 Detailed cost analysis on individual tracts was not completed. In accordance with regulations, the final showings would be available for any leases issued on PRIAs. Economic costs were based on subjective evaluations of depth to coal seam, coal seam thickness, and haul distance. However, the assumption is made that the Star Lake Railroad will exist.

It should be noted that seldom, if ever, will the least social effects, fewest environmental consequences and least economic costs occur on the same tract. For example, while the Nageezi tract may not have a low economic cost it may well be socially and environmentally less costly than other tracts. Also as discussed on page 1-4 the tracts to be leased may be selected on a tract-by-tract basis not necessarily on an alternative basis.

51.3 See the response to comment 51.2. This tract was included by the Regional Coal Team because industry expressed interest in the tract. This tract underwent extensive exploration drilling by industry.

51.4 The coal underlying the Ah-shi-sle-pah WSA is Federal coal for which PRIA have been granted. Ah-shi-sle-pah was not recommended for wilderness status in the Chaco MFP. As such, it was necessary for us to analyze the impacts from leasing and developing of the coal within these PRIA boundaries. Leasing will not take place until Congress makes a decision on these WSAs. BLM recognizes wilderness deserves equal consideration with other resources and uses on public lands.

51.5 No assumption of PRIA lifetime production of 632 million tons was made at any time for the EIS. This figure is derived from a working document which was not used for any estimates beyond the year 2000 (see also 51.13), including production estimates.

Table 1-1 indicates production is anticipated to occur well beyond the year 2000; Figure 1-1, therefore, does not necessarily reflect the maximum production over the life of the mines, and impacts are not understated. The companies are not "claiming production of 36 million tons per year." This will depend on the relative production schedules of the PRIAs, although this average level could clearly be met within the parameters of Table 1-1 and Figure 1-1 with production of less than 40 million tons per year beyond the year 2000. It should be emphasized that the mine lives shown in Table 1-1 are estimates based on production forecasts, not regulatory requirements. The diligent development and continued operations requirements will permit a slower development pace than that shown in Table 1-1, particularly for leases not part of logical mining units. We do not have the discretion to reveal production from individual PRIAs before a lease is issued.

- 51.6 See the response to comment 51.5.
- 51.7 See the response to comment 51.5.
- 51.8 The 1.87 billion ton figure was for the PRIA "area" on a township basis and included fee and State coal. The 1.5 billion tons is an old figure that includes two PRIAs in Colorado which are not in the scope of the EIS and two PRIAs in New Mexico which have subsequently been dropped. The 1.15 figure is current and is based on in-place reserves of 2.5 billion tons. The 1,404 million tons referred to also includes two existing leases. The 682 million tons was a production figure, not a reserve estimate, and is derived from portions of a working document not used in the DEIS (see also 51.5).
- 51.9 The 2.2 billion tons referred to in-place reserves and has been revised to 2.3 billion tons. The 1.4 billion tons was in error. (Also see comment 51.8).
- 51.10 The text has been revised to show existing and proposed mines that were considered in the No Action Alternative, and associated coal reserves. The production baseline for the No Action Alternative is based on a high likelihood of production occurring by the indicated dates, not including coal subject to significant uncertainties, and is unchanged (memorandum of March 16, 1982, BLM NM State Director to BLM Director). Many of the listed mines are subject to such uncertainties. The DEIS attempted to indicate the reserve base apart from such uncertainty because of mine plan or contract commitment. Many "filed" mine plans do not have operating permits, and permit jurisdiction has changed since filing. Many "contract commitments" cannot be considered firm in light of recent company pullouts or litigation; e.g., WESCO, EPNG, Tuscon Gas and Electric Gallo Wash, Star Lake, South Hospah. In addition, a portion of the projected production from some tracts; e.g., Lee Ranch, Black Lake is included in the other alternatives. (See also 58.15).
- 51.11 The production estimates for non-Federal coal were derived from several sources in consultation with other State and Federal agencies. Past estimates for these existing coal sources have varied widely and such estimates are difficult to predict in the scope of the EIS because they are largely non-Federal actions and reflect production capacity rather than forecasts. It should be emphasized that no quantification of impacts is made in the EIS for actions which are beyond the control of the BLM.
- The reference to "leased Federal coal" under this alternative was corrected in the Second DEIS. Also see 58.15.
- 51.12 Refer to the response to comment 51.10.
- 51.13 It is acknowledged in the DEIS that peak production may occur after the year 2000 (page 4-34), but specific impacts beyond the year 2000 are too speculative to analyze (page 3-1). Also see the response to comment 51.16.
- 51.14 Tracts which were forecast to begin production well after lease issuance were part of preliminary logical mining units. The purpose for leasing such tracts now is to prevent bypass situations before formal logical mining unit designation.
- 51.15 The due diligence requirements may be applied to logical mining units not necessarily following tract configurations. The production levels were developed for the DEIS on a tract basis. An increase in production from the introduction of mining on a specific tract may therefore occur long after the first mining year requirements of due diligence are met. The annual production of 14.2 million tons mentioned by the commentor, which includes a production of 10.3 million tons per year from the South Hospah Mine with initial production in the year 2010, was not used in the DEIS because it was beyond the year 2000 (see 51.13). Instead, the production estimates of 3.4 million tons a year from the approved mine plan were effectively used in the "No Action Alternative". Note that Federal coal production (Hospah #1 and 2) is only a small percentage of this mine's total, and would not occur in the mine plan until well after the year 2000.
- 51.16 It was the original intent to analyze economic and social change for a period of 15 to 20 years (the period for which a reasonable degree of accuracy in projections can be expected). Therefore, production figures were looked at through the year 2005. It was determined that the year 2000 was the point within the projection period when the production rate seemed to level off (certainly taper off was not an accurate description). The year 2000 was then set to be the year we would analyze as the peak production period.
- Later requirements were to carry the production figures through a 50-year period for use in the cumulative overview. These figures showed that in the Bypass, Minimum Surface Owner Conflict, Target, and High Level Alternatives the year 2000 was not the peak production year. The Bypass Alternative showed the greatest difference between the year 2000 production figure used (3.9 million tons) and the actual peak (12.8 million tons) occurring in the year 2013. The next largest difference occurred in the Target Alternative where the year 2000 was 25.9 million tons and the actual peak was for 2015 at 31.5 million tons. The Minimum Surface Owner Conflict Alternative difference was 13.3 million tons in year 2000 compared to 15.1 million tons in 2025. The High Level Alternative difference was 44.2 million in the year 2000 and 44.5 million tons in the year 2004. When these differences were realized it was determined that the degree of accuracy achieved by changing the year of analysis for the economic and social factors would not be greatly improved because this would require predictions 30 years in the future. Therefore the analysis was not changed. However, the reference to the year 2000 being the peak production should have been changed to a more accurately descriptive term.

- 51.17 See the response to comment 51.16.
- 51.18 See the response to comment 8.4.
- 51.19 Regardless of whether or not the Star Lake Railroad has a Certificate of Public Convenience, when and if the railroad is permitted by ICC, the date of construction of the railroad is at the discretion of the Santa Fe Pacific Railroad.
- 51.20 Production levels from competitively leased tracts were based on reasonable estimates of physical capability and compliance with existing regulations. No change of assumptions was necessary to imply diligence would be met; rather, the text was clarified to reflect that individual tracts need not be in production in 10 years if included in a producing logical mining unit (LMU). Likewise, the statutory requirement is for an LMU to be mined out in 40 years (not "mines" or tracts). There is no longer a regulatory requirement for a lease to be in an LMU (43 CFR 3475.6); therefore, a mine can last in excess of 40 years. Of the nine tracts mentioned in the Environmental Defense Fund's original comments, three tracts show an apparent inconsistency with the worksheets upon which Figure 1-1 and Appendix A are based, and the diligence requirements. In the worksheets, Lee Ranch and Divide show that diligence would not be met without inclusion in an LMU; yet, a mine life of 42 years is indicated. Appendix A has been changed to reflect a 40-year mine life. Since the required correction in the worksheet is beyond the year 2000 and the impact scope of the EIS, no change in production forecasts in the text is required. The Breadsprings 2 tract shows a 50-year mine life, but diligence is not met as a single lease. The mine life and production rates for the tract reflect a reasonable estimate for the tract as now configured. It is acknowledged that an operator would be required to either segregate Breadsprings 2 into more than one lease in an LMU combination with other leases, or produce at a faster rate, to meet the 40-year requirement. Since production is not anticipated until the year 2000, no change in the impact analysis is required. Please note that the EIS is an attempt to reasonably estimate the impacts of the various leasing alternatives. Nothing in the EIS shows "violations of the due diligence clause" or "mine lives exceeding the statutory 40 year limit," because LMUs have not yet been designated. Tracts may be segregated into more than one lease (and diligence requirement) in the future, and leases are not required to be in LMU, thus permitting mine lives in excess of 40 years.
- 51.21 The recovery factors used to generate Tables 2-1 through 2-4 are standard industry estimates which in no way attempt to usurp the function of an approved resource recovery and protection plan.
- 51.22 Receipt of fair market value for competitively leased coal is both Departmental policy and a regulatory requirement (43 CFR 3422.1). Procedures for determining fair market value were established by the Secretary of Interior on July 26, 1983 and include both a procedural minimum bid and a Fair Market Value and appraisal test. Tracts are not "tailored to a single bidder," but rather tailored to multiple use, logical mining units, by-pass prevention, and available data, which may include that of an exploration license of an individual bidder. A coal estate exchange has been proposed to specifically increase the competitive potential in the Lee Ranch Area. Regarding EDP original comments that the sale would occur during a "natural coal glut" and exacerbate a "local coal glut," the EIM does not acknowledge such market conditions. The need for leasing in the Region has already been established (see EIS pages 1-1 and responses to comments 8.3, 51.18, 59.3 in this chapter). Note that the seven tracts mentioned in the Preface lacked cultural data, and this will be noted for the Secretary in the Record of Decision. The text has been revised regarding the data sufficiency of these tracts.
- 51.23 Upon receipt and review of the comments received on the first draft, extensive changes were made in the section you commented on (see comment number 5 reproduced below). Because of these changes, the comment no longer pertained to the new material; therefore it was not designated as a comment requiring a response.
5. Page 14. "Projected coal production in 1987 and the year 2000 would be approximately, 41 and 47 million tons, respectively
- The Non-PRLA portion of this sentence is undocumented. When EDP requested documentation, the only thing supplied was a 1982 Lusher to Burford memo which argues for 1990 production of 48 million tons.² This memo provides no breakdown by categories, and says nothing about 1987 or 2000. EIM indicated no other documentation existed.
- The comment noted above pertains to all of the coal (PRLA and Non-PRLA) considered in the No Action Alternative. A PRLA or Non-PRLA portion cannot be extrapolated from this sentence or the rest of the No Action section. The 1987 and the Year 2000 figures were developed by Resource Area Office Staff in Farmington after the March 1982 letter for impact identification and analysis purposes. Keeping in mind the sequence of the letter and development of the EIS material, there are no contradictory statements.
- 51.24 The peak production referred to is within the chronological scope of the EIS as shown in Figure 1-1, and page 3-1.
- 51.25 Although production from other sources decreases with time after 1987 in Figure 1-1, it starts from a much higher level than shown in the mine plans referred to by the Environmental Defense Fund (EDF), and overall production in Figure 1-1 increases except in the No Action Alternative. This discrepancy arises from the greater percentage of overall production

- 51.25 assigned by EDF to PRIAs in 1987 than that shown in Figure 1-1. EDF has erroneously assumed that full PRIA production will occur on the startup dates shown in Table 1-1 (Table A, EDF comments, in Final San Juan Basin Cumulative Overview and Comment Letters, USDI, BLM, 1983, page CL-120). It should also be noted that production estimates for the No Action Alternative were developed in consultation with other agencies (see 58.15) and several of the mine plans listed are out-of-date and subject to significant uncertainties (see responses to comments 51.10, 51.12, and 59.1).
- 51.26 See the response to comment 51.24.
- 51.27 The total reserves for the Nageezi Tract were changed to reflect stipulations to prevent subsidence under Pierre's Site. This will affect mine life beyond the year 2000 rather than recovery rates; and therefore, has no effect on Figure 1-1. The 70.35 tons referred to erroneously appeared on worksheets because it was felt that one Lee Ranch Tract should reflect the current mine plan production schedule. Revision of the worksheet would simply extend the mine life which is already well beyond the chronologic scope of the EIS. Production estimates will, therefore, remain as written in the text. Note that because the Lee Ranch Mine is expected to proceed with or without new Federal leasing or the proposed exchange, these production figures are repeated at roughly the same levels in the No Action Alternative. If anything, the impacts from Lee Ranch are overstated.
- 51.28 See the response to comment 18.1. The EIS simply acknowledges that under the High Alternative the maximum analyzed impacts could occur. The EIM maintains that a worst-case analysis has been completed as required in 40 CFR 1502.22.
- 51.29 See the response to comment 51.13.
- 51.30 Page 3-3 does not state that production will begin by 1994 for "any tract" but rather required by the Mineral Leasing Act. The 10-year, diligent-development period can be applied to Logical Mining Units (LMU) in place of specific leases and some tracts are assumed to be in IMUs with start up on other properties.
- 51.31 The 50 percent recovery factor for underground mining is not applied to the "reserve/resource" base listed in Tables 2-1 through 2-4. It is applied to the "mineable reserves/resources" listed in Appendix A. This is largely due to the restriction of underground mining to single seams and roof heights of 12 feet. For example, two 20-foot seams separated by 30 feet of interburden would have 6 feet of recoverable coal if mined by underground methods.
- 51.32 Colorado production has been included in the No Action Alternative. None of the other alternatives address impacts in Colorado because no impacts are expected in the Colorado portion. Federal Coal Region boundaries are not necessarily identical to impact areas.
- 51.33 The No Action Alternative does consider coal production from southwestern Colorado. See the response to comment 51.32. Subsequent leasing needs in Colorado and the 2nd coal fields will be analyzed when and if these areas are leased. Future lease sales will consider leasing needs at the time the sale occurs. This includes Federal coal already leased. It should be noted that the purpose of a coal EIS is to analyze the impacts of coal leasing, not to justify the need.

51.34 The information presented in the first DEIS was a summary of the cumulative overview. Comments 68 and 69 from the Environmental Defense Fund referred to the New Mexico Generating Station. These issues were adequately discussed in the Final New Mexico Generating Station EIS and the Final Cumulative Overview and are, therefore, not considered substantive comments on the Coal EIS.

51.35 The EIM responded to a similar comment in the Second DEIS (see page 4-122). The EIM made no inflation assumptions. The EIM is aware that there are a number of variables which make it impossible to project accurate royalty amounts over time. The royalty rates are a percentage of the selling price; therefore, if the price changes due to inflation or other market factors, the amount received from royalties also changes.

Also the terms and conditions of leases are readjusted by EIM as necessary every 10 years. The 12 1/2 percent is a minimum royalty rate the EIM could increase the rate as the leases are readjusted. This would also change the royalty amounts received. These figures are, therefore, presented merely to give an approximate amount of royalties that could be generated from coal development.

51.36 The revised numbers are not contradictory because they reflect two different tracts: the Gameroo #1 (LC) and Gameroo #1 (HC) (see Table 2-4). The mine life of the low confidence tract has been changed to reflect an arithmetic error.

51.37 The baseline production for the No Action Alternative resulted from an upward adjustment of an estimate derived during consultation with State and Federal agencies. Neither the original nor the revised number is the sum of production estimates from individual mines; specific mines were examined along with reasonable forecasts to arrive at projections. These projections fell within the range of production sums for individual mines prepared by EIM (memorandum dated March 16, 1982, EIM New Mexico State Director, to EIM Director). EDF's production summary (Table A, in Final San Juan Basin Cumulative Overview and Comment Letters, USDI, BLM, 1983, page CL-120) incorrectly assumed PRIAs would reach full production during the first year of operation. It also included several mine plans subject to significant uncertainties.

51.38 All of the material received from the public (hearing transcripts and letters) was reviewed and comments were identified and designated for further consideration and response. The basis for designating comments is based on clear, specific statements that address the adequacy of the document, merits of the alternatives (40 CFR 1503.3(a)), or points that need clarification. By following these criteria, not all of the remarks submitted were designated as requiring responses. In addition many times only the specific points or parts of the remarks pertaining to the adequacy of the EIS were identified as requiring responses. This resulted in responses being prepared for a portion of what the commentor considered to be a comment. See the response to comment 51.23 in regard to comments that were not addressed because of changes made in the EIS.

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November 18, 1983

Mr. Charles W. Luscher
State Director
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Caller Service 4104
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Dear Mr. Luscher:

Attached are the comments of the Natural Resources Defense Council, Inc., the Environmental Defense Fund and the National Wildlife Federation on the Second Draft San Juan River Regional Coal Environmental Impact Statement. Our comments focus on the treatment of the 26 pending preference right lease applications (PRLAs). While we commend the Bureau for removing PRLA issuance from the "no action alternative," we find most of the same deficiencies in the Second Draft as we criticized in our comments on the First Draft. As a result, it fails to meet the requirements of the National Environmental Policy Act, the Court's decision in NRDC v. Berkland, and the Director's memorandum on the contents of environmental impact statements on PRLAs.

Sincerely yours,

Laura B. King
Laura B. King

LBK:as
Enclosure

I. Introduction

These comments are submitted on behalf of the Natural Resources Defense Council, Inc. (NRDC), the Environmental Defense Fund (EDF), and the National Wildlife Federation (NWF). NRDC, EDF, and NWF are national, environmental organizations with long-standing concerns about the management of public lands and the leasing of federal coal throughout the West, including in New Mexico. We submitted extensive comments, which we incorporate here by reference, on the first San Juan River Regional Coal Environmental Impact Statement (First Draft). As will be discussed below, most of the concerns raised in our comments on the First Draft have not been addressed by either the revised text or the responses to comments in the Second Draft San Juan River Regional Coal Environmental Impact Statement (Second Draft).

Our comments on the Second Draft, like those on the First Draft, will focus exclusively on the treatment of preference right lease applications (PRLAs). Our concentration on the PRLAs should not be taken as a lack of interest in, or concern about, other critical issues raised by the proposed competitive lease sale. Indeed, we believe that competitive leasing in the San Juan River Region is completely unnecessary at this time, even at the reduced level proposed in the Second Draft. Moreover, many of our criticisms of the environmental analysis of PRLA development apply with equal force to the analysis of impacts on the competitive lease tracts. A number of other groups addressed these issues in their comments on the Second Draft. We incorporate by reference

the comments on these subjects by the Southwest Research Information Center, the Environmental Defense Fund, and the National Wildlife Federation.

We are particularly concerned with the handling of the PRLAs for two reasons. First, the land involved in the 26 PRLAs in New Mexico includes some of the most outstanding wilderness, visual, archaeological, and paleontological values in the nation. As a result, these PRLAs are high on the list of areas where coal development should never be permitted to occur. But prospecting permits were originally issued on these lands with absolutely no regard for their higher values.

Second, our organizations have spent the last year monitoring the Bureau of Land Management's (BLM) handling of PRLAs in other western states. We find that the Second Draft shares many of the deficiencies of the environmental documents prepared on PRLAs by other BLM offices, which documents have already been found to be inadequate by the Director of the BLM. Moreover, the Second Draft fails to comply with the instructions issued by the Director regarding the contents of environmental impact statements (EISs) on those PRLAs. In particular, the Second Draft does not satisfy the Director's requirements regarding alternatives, site-specific and detailed impact assessment, and analysis of mitigation measures. A copy of the memo containing these directions is included with these comments.

The Second Draft makes only one meaningful change in response to our comments on the First Draft: the issuance of the 26 PRLAs has been removed from the "no-action alternative." The responses of the Second Draft to the rest of the concerns raised in our comments consist essentially of repeated attempts to rationalize the decision not to provide additional information in the Second Draft. For this reason, our comments on the Second Draft bear a marked resemblance to those on the first. To summarize, we believe that the discussion of the PRLAs in the Second Draft is inadequate for the following reasons: (1) it contains no site-specific information about the individual PRLA tracts and, as a result, it does not provide an adequate analysis of environmental impacts; (2) it does not adequately consider alternatives to issuance of each of the PRLAs; (3) it fails to analyze the effectiveness of the proposed mitigation measures; (4) the proposed mitigation measures will not, in fact, mitigate impacts of development; and (5) it contains no estimates of the costs of proposed mitigation measures. The BLM would be ill-advised to issue any of the 26 leases based on this faulty environmental analysis.

II. The Second Draft Lacks Site-Specific Analysis of the PRLAs.

As we pointed out in our comments on the First Draft, NRDC v. Berkland, 458 F. Supp. 925 (D.D.C. 1978), aff'd, 609 F.2d 553 (D.C. Cir. 1979), clearly requires the BLM to collect site-specific information on PRLAs in order to evaluate the

environmental impacts of their development, to develop appropriate mitigation measures, and ultimately to decide whether a lease may be issued. In response to our criticism that the First Draft failed to contain such site-specific information, the Second Draft employs an elaborate chain of illogic. First, it claims that the site-specific information included in the First Draft and the earlier Environmental Assessments is "sufficient to allow reasoned decision making on lease terms and alternative means of proceeding, such as exchanges." P. 4-31.* Second, it claims that the costs of gathering any more detailed information would be exorbitant. P. 4-163. Finally, it alleges that such information is "not necessary for a reasoned and informed choice among the alternatives due to the strict environmental protection program which follows lease issuance." *Id.*

We are not surprised to find that the Second Draft contains no new site-specific information on the PRLAs, given the short amount of time since the publication of the First Draft. The fact is that neither this EIS nor the previous Environmental Assessments contain sufficient site-specific information with which to determine whether the 26 preference right leases should be issued. We dispute the claim that the cost of obtaining additional information would be exorbitant, and there is no validity to the assurance that "the strict environmental protection program which follows lease issuance," *Id.*, obviates the need to analyze

*Unless otherwise noted, all page references are to Second Draft.

52.1

the impacts of issuance carefully prior to lease issuance.^{1/} Indeed, the proposed "lease now, worry later" approach is flatly prohibited by the Berklund decision.

The Second Draft contends that a review of the Draft Environmental Assessment, the Final Environmental Assessment, and the First Draft "reveals extensive, detailed, and significant site-specific information." P. 4-161. Having reviewed the pages cited in support of this conclusion, we fail to find the necessary site-specific information. The list consists completely of tables and maps, all of which describe with the broadest brush the resources and likely impacts on each of the PRLA tracts. Nowhere in any of the documents do we find written descriptions of each individual PRLA tract. Nowhere is the information displayed in the tables and maps gathered and analyzed in a way that the impacts of developing each individual tract can be evaluated. In part, the problem is a matter of presentation: to the extent that site-specific information is available, it has been scattered throughout the document in a way that makes it virtually impossible for decisionmakers and other readers to evaluate problems associated with individual tracts. However, the problem is also one of quality and quantity of data, as is discussed below.

52.2

^{1/} The notion that the post-lease issuance program provides sufficient environmental protection is particularly tenuous given the recent findings by the Office of Surface Mining as to the inadequacy of New Mexico's reclamation program. See Coal Week, November 14, 1983, p. 3.

The Second Draft is correct in suggesting that our comments stem "from a different view on how much information should be in the DEIS." P. 4-162.

It is incorrect, however, in implying that we have proposed the preparation of a mine plan as a prerequisite to issuance of a lease. We are not suggesting that the lessee needs to provide more information. Rather, we are asserting that the BLM must collect more information before it can develop effective mitigation measures and determine whether the leases are to be issued.

The Second Draft states that more detailed, site-specific information is not needed prior to lease issuance because:

The goal is to identify potential conflicts which may cause problems if mining goes forward and to either eliminate the problem areas from each lease or to condition development through lease terms to retain the right to protect these potentially difficult areas if the more detailed study shows that the lessee is unable to develop the techniques to resolve the problem.
P. 4-163.

This statement appears to reflect a basic misinterpretation of the BLM's obligations with respect to these applications. The BLM must do more than "retain the right to protect" the resources that will be affected by development of these leases in the event they are issued. It must identify -- in advance -- mitigation measures that will protect those resources, and reject applications where it is determined that adequate protection measures are not available. Indeed, not just the Berklund decision, but also the Interior Department itself has recognized that mitigation may be

impossible to achieve in some cases, and that in such cases the costs of mitigation would be so high as to preclude the possibility of a successful commercial quantities showing. Berklund at 937; Secretarial Decision: Preference Right Lease Applications Rejected (attached at end of comments).

The Second Draft also takes refuge in the argument that the costs of obtaining site-specific information would be exorbitant and suggests that information collection can therefore be postponed instead to the mine plan stage. It admits at the same time, however, that "[a] decision to issue a federal coal lease is an irretrievable commitment of resources" P. 4-162.

It is precisely because issuance of preference right leases would represent such an irretrievable commitment that the Berklund decision expressly prohibits postponement of site-specific analysis to the mine plan stage:

[The] contention that NEPA will be best served by deferring an EIS to the mining plan approval stage conflicts sharply with NEPA's reasonable policy requiring an EIS prior to the 'irreversible and irretrievable commitment of resources.' Berklund at 938-39.

The claim that the costs of gathering the information are exorbitant is unsubstantiated and, we believe, insupportable. Since the Second Draft concedes that the information must be collected, albeit later, at the mine plan stage, it is clear that the costs of obtaining it are not too high to be borne. Moreover, since the preferred alternative is to issue all 26

52.3

leases, no money would be saved by postponing the gathering of site-specific data. In fact, the claim of exorbitant costs is plainly disingenuous in light of the fact that the Second Draft fails to include a worst case analysis, as is required by the Council on Environmental Quality's regulations in such cases.^{2/} See 40 C.F.R. § 1502.22(b).

52.3

The lack of site-specific information and the consequent inability to predict impacts is a repetitive theme throughout the Environmental Consequences chapter. This deficiency is described below for several key resources.

A. Reclamation

The Second Draft admits that the BLM does not yet have site-specific information as to the feasibility of reclamation on individual tracts:

All of the PRLAs and competitive coal tracts will receive a site-specific determination on the mine plan regarding their reclamation potential before mining occurs. P. 1-26.

Such a postponement of the reclamation feasibility analysis is impermissible, as indicated above. Indeed, the Berklund decision specifically stressed the importance of reclamation, suggesting that, "Reclamation of an arid area ... might not be feasible under

^{2/} The Second Draft does state that, if reclamation is ineffective, in the worst case the result will be "erosion, increased air pollution, increased sediment loads, reduction in water quality, loss of soil productivity, and decrease in economic returns from livestock operators." P. 3-11. This statement hardly constitutes a worst case analysis.

present technology." Berklund at 937. The BLM's failure to analyze reclamation is particularly inappropriate given the difficulties with reclamation that have been experienced in New Mexico in the past and that are likely to occur in the future.^{3/} The Second Draft glosses over these problems with such statements as, "the revegetation efforts at [the San Juan and Navajo] mines have improved to the point where they have been establishing adequate plant cover." P. 3-9. However, no citations are given to support this statement. The Second Draft does not specify the plant cover at these plots, nor the extent to which irrigation has been employed.

Moreover, the Second Draft does admit that,

Revegetation has not existed for sufficient time to evaluate fully whether the reestablished vegetative community will be capable of self-regeneration in plant succession; and long-term plant diversity is questionable. P. 3-9

Since diversity and capability of self-regeneration are necessary to satisfy the definition of reclamation under the Surface Mining Control and Reclamation Act, 30 U.S.C. § 1265(b)(19), the Second Draft thus strongly implies that reclamation potential for the PRLA area is at best questionable. Given the questions about the ability of the San Juan Region to support true reclamation, the lack of site-specific analysis of the individual PRLA tracts' reclamation potential is indefensible.

^{3/} See, e.g., Wiener, Daniel Philip, Reclaiming the West (1980), pp. 127-55.

B. Water Impacts

The Second Draft also admits the lack of adequate data to evaluate site-specific surface water impacts for each of the PRLA tracts:

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The specific impacts on surface-water resources for an individual coal tract cannot be adequately evaluated given the existing information
P. 3-12.

Similarly, groundwater impacts are discussed only in the most general of terms. For example, it is hypothesized that "the greatest ground-water quality impact would probably be to the alluvial aquifer downstream from a mined area." P. 3-15. Assuming

this is true, the BLM must identify which PRLA tracts are upstream from alluvial aquifers and must describe the existing uses from those aquifers that would be impacted by their destruction. However, nowhere does the Second Draft address these critical questions.

52.6

C. Paleontological and Cultural Resource Impacts

The Second Draft provides little illumination on how issuance of each of the PRLAs would affect the highly valued paleontological and archaeological resources in the region. It states that 1,137 "known fossil localities" would be disturbed by issuance of the PRLAs. P. 3-28. No information is provided as to the relative value of these sites, or of their geographic

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distribution on the PRLA tracts. Are they all clustered in one tract, or are they dispersed evenly throughout the PRLA area? Does any one tract or group of tracts have greater paleontological resources than another?

The discussion of cultural resources is slightly better, for it does admit that 20 of the 26 PRLAs lie within ten miles of Chaco Culture National Historical Park. However, it does not identify these PRLAs, nor does it describe the value or distribution of the 171 known sites and estimated 542 sites that could be destroyed through mining activities. ^{4/} P. 3-34.

In short, the Second Draft contains little more site-specific information on the environmental consequences of PRLA development than does the First Draft. The arguments relied upon by the Second Draft to justify this "lack have no legal basis. As is discussed below, the failure to collect site-specific information has led to other serious deficiencies in the Second Draft.

^{4/} While one could determine the location of the PRLAs relative to Chaco Culture National Historical Park from one of the maps in the Draft Environmental Assessment, it is critical that this kind of information be included in written text describing each of the tracts.

III. The Analysis of Alternative Mitigation Measures Fails to Evaluate Effectiveness of the Proposed Mitigation Measures.

The Second Draft's discussion of alternative mitigation measures is a welcome addition. In our view, some of the alternatives discussed would be far superior to the "committed" mitigation measures.^{5/} However, a major failing of this section is that, while it does discuss the effectiveness of the alternative mitigation measures, it does not contain any analysis of the effectiveness of the "committed" mitigation measures.

The requirement that this EIS contain "a careful examination of possible performance lease standards [and] alternative methods for meeting those standards," Berklund at 938, clearly applies to proposed or preferred mitigation measures as well as to alternative mitigation measures. We cannot understand, therefore, why the Second Draft fails to include such an analysis. Given the deficiencies of the "committed" mitigation measures, discussed below, the failure to discuss their effectiveness represents a major shortcoming in the Second Draft.

IV. Neither the "Standard" nor the "Special" Stipulations Will Effectively Mitigate the Environmental Impacts of PRLA Development.

The lease stipulations in Appendix I-2 of the Second Draft are virtually identical to those presented in the First

^{5/} In particular, the alternative mitigation measures for American Indian concerns represent a vast improvement over the proposed measures.

Draft, with the only difference being that the Second Draft identifies the tracts to which each stipulation applies. Unfortunately, the general language of these stipulations prevents them from assuring adequate protection from impacts of coal development. Specific problems with many of the stipulations are discussed below in the order of their presentation in Appendix I-2.

The stipulations for protection of grave sites specify that the area surrounding the grave sites is unsuitable for surface mining unless the lessee lawfully relocates the grave site(s). But even lawful relocation is considered to be disruptive to the spiritual values of the grave sites. As one Navajo man explained,

Who is going to carry the remains of the graves of our ancestors to another place? We are not allowed by our religion to perform such things. These people here are saying that all that needs to be done is to move the remains out of the way to another place, and then we can dig there again ... I don't know who is telling them all this, but it is not right.^{6/}

Therefore, this stipulation protects neither the physical grave sites themselves, nor their spiritual values.

The stipulation pertaining to Wilderness Study Areas states

that the Denazin Wilderness Study Area is "suitable for underground coal mining with no surface occupancies or subsidence."

P. I-6. No attempt is made to define what method should be employed to prevent subsidence or to evaluate whether

^{6/} Testimony of Leonard Tsogie at BLM hearing on March 17, 1983; translated and transcribed in The Chaco-Bisti News, Fall 1983.

52.11 underground mining can be conducted without subsidence. Thus, this stipulation has little meaning or force.

With regard to cultural resources, the proposed stipulation allows surface coal mining operations after the lessee carries out measures in accordance with the plan to be approved later by the Office of Surface Mining. Such postponement of the plan to mitigate impacts does not in and of itself constitute a mitigation measure. The plan itself must be included in the stipulation.

52.12 For protection of areas in floodplains, the proposed stipulation relies on the mining plan submitted by the lessee to specify measures needed to ensure that mining will not harm people or property. Again, this postponement of mitigation measure to the mine plan stage is not acceptable; it is the BLM's responsibility to specify needed mitigation measures prior to lease issuance.

The stipulation for the protection of water resources is fatuous: "the lessee shall protect the physical and legal availability of existing water sources in the lease application area." P. I-7. This stipulation implies that such resources can be protected in the face of mining, when the discussion in the text on environmental consequences to water resources clearly shows that such protection is impossible. Pp. 3-12, 3-14. The water protection stipulation should identify specific water resources near which development is prohibited, or for which impingement upon must be compensated.

Another stipulation with little meaning is the requirement that the lessee shall return lands to "the visual resource management class or better" that existed prior to surface mining. Given the questions about reclamation that even this EIS concedes, this stipulation is wholly problematic, and therefore does not represent an effective safeguard against disruption of the visual resources of these PRLAs.

The stipulation that the lessee notify Navajo residents six months before coal mining is to begin essentially acts to transfer any mitigation responsibility to the Navajos: indeed, one of the purposes of this notification is to "provide an opportunity for Navajo religious practitioners to conduct mitigatory actions." P. I-8. In fact, it is unclear whether any of the listed so-called mitigatory actions can effectively mitigate the impacts of coal mining operations. In any event, the costs of mitigation must be borne by the lessee, not by the Navajos.

One stipulation purports to recognize the importance of protecting the Bisti/Denazin Area of Critical Environmental Concern (ACEC), but fails to specify how such protection will be afforded. By definition, an ACEC is an area where "special management attention is required ... to protect and prevent irreparable damage" 43 U.S.C. § 1702(a). However, the stipulation simply states that the lessee shall conduct coal mining operations "in a manner which minimizes adverse impacts to the recreational,

scenic and scientific values" of the area. Since coal mining is inherently inimicable to those values, it offers at best only a false sense of protection and does not reflect the "special management attention" that is required.

The only protection offered for paleontological resources by the proposed stipulations is that a study be conducted by the lessee. As we stated above and in our earlier comments, studying a resource does not mitigate the impacts to it and is no substitute for binding mitigation requirements.

Other than the outright designations of unsuitability, most of these stipulations offer no tangible means of mitigation. While their inclusion in the Second Draft suggests awareness by the BLM that the resources need to be protected, their contents show that the BLM has yet to come to grips with the impacts of coal development on these areas, or with the question of how best to mitigate those impacts, or indeed with the possibility that they cannot be mitigated at all. We believe that the problem is directly tied to the lack of site-specific information on each of the tracts discussed above. Not until BLM understands what needs to be protected can it propose effective mitigation measures, and not until meaningful mitigation measures have been developed can BLM request a final showing or proceed with the issuance of these PRLAs.

V. The Second Draft Does Not Contain an Estimate of the Costs of Proposed Mitigation Measures.

Since the proposed stipulations are so hollow, it comes as no surprise that the BLM has not failed to provide any cost estimates for them. The Second Draft argues that rather than including cost estimates in the EIS, they can be

considered as part of the final showing evaluations so the BLM 'can benefit from the permittees' greater knowledge of current technology in his assessment of the cost and effectiveness of such technology prior to (BLM's) final decision on the setting of lease terms.' Berkland (sic), 458 F.2d 925, 437 (D.D.C. 1978). P. 4-32.

Of course; the final showing must include the costs of mitigation measures. This fact does not excuse, however, compliance with the requirements of the National Environmental Policy Act (NEPA).

As the Berkland Court held,

NEPA demands, nevertheless, that a detailed and informed analysis of the environmental costs be prepared and available prior to the issuance of the lease. Berkland, p. 939.

Even assuming that the permittee may be in a better position than the BLM to estimate some of these costs in some cases, an initial estimate of costs must be provided in the draft EIS, upon which the permittee can comment. If those cost estimates appear too high to the permittees, they will undoubtedly bring that to the attention of the BLM.

VI. The Second Draft ~~of the~~ Not Adequately Consider Alternatives to Issuance of the PRLAs.

The Second Draft considers two alternatives to issuance of the PRLAs: exchange of tracts with Navajo occupants, and exchange of the tracts located in the Ahshislepah area and tracts with special paleontological values. We commend the BLM for considering these two alternatives. However, the discussion omits several other important alternatives, and therefore cannot be considered complete.

First, the alternatives section completely ignores the possibility that some applications for leases may be denied on the grounds that mitigation of environmental impacts will be so costly as to make the tracts uneconomic to mine. For example, the Ahshislepah tracts should be found unsuitable for surface mining, which would thereby undoubtedly prevent satisfaction of the commercial quantities test. See, e.g., Coal Week, November 7, 1983, p. 2. If some of the tracts are exchanged, such as those with Navajo occupants, the Star Lake railroad may never materialize, making other tracts uneconomic and therefore the lease applications subject to denial.

Moreover, the Second Draft fails to consider another option explicitly mentioned in Berklund as an alternative, if an exchange is not agreed to by a permittee and if "the cost of compliance with the lease terms does not defeat his showing of commercial quantities." Berklund at 338. In that case, the BLM has "the

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4-1118

option of withdrawing the public lands or recommending to Congress that the preference lease right be cancelled upon payment of just compensation." Id. In light of the fact that Arch Mineral, holder of PRLAs in the Ahshislepah area, has indicated its unwillingness to settle for an exchange, see Coal Week, supra, consideration of such alternatives is particularly important.

Finally, the discussion of exchange, while a step in the right direction, fails to consider exchange of individual PRLA tracts. The BLM must consider, one by one, whether it is in the public's best interest to lease each tract, and, if not, how best to proceed. Given the fact that the "main benefit" of exchanging all the PRLAs "would be to direct coal development away from the areas of highest paleontological, cultural, and socioeconomic conflict..." p. 3-54, it is incumbent upon the BLM to consider exchange or alternatives to issuance for each of the tracts. While the exchange section identified certain factors suggesting that some tracts may be less desirable to lease than others, it clearly indicates that the BLM has not made the necessary tract-by-tract evaluation to determine the best policy for each tract. This failure is undoubtedly related to the lack of site-specific information discussed above, and again points to the need for such site-specific information.

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VII. Conclusion

While we commend the BLM for preparing this Second Draft EIS, the document does little to correct the deficiencies of the First Draft. The lack of adequate site-specific information and the failure to evaluate the impacts of PRLA development on a tract-specific basis have evidently made it impossible for the BLM to develop "the particularized lease terms" that are a prerequisite to the issuance of any of the preference right leases. We urge the BLM to collect the needed information and develop more specific mitigation measures prior to issuance of the Final EIS.

Responses to comment letter #52.

- 52.1 Appendix A has been revised to include PRLA tract-specific summaries. Also see the response to comment 21.4.
- 52.2 Site-Specific Environmental Analysis Summaries for the PRLAs are located in Appendix A-1.
- 52.3 See the response to comment 21.4.
- 52.4 See the response to comment 50.1.
- 52.5 Statements are based on personal observations at these mines and publications by San Juan Coal Company on its reclamation efforts (Ferraduno 1982).
- 52.6 See the response to comment 11.4. Water uses that would be impacted by mining must be protected or replaced by the applicant.
- 52.7 This type of information is available in the BLM's Draft and Final EA for Coal Preference Right Leasing, pages 2-52, 2-53, 3-24 and 3-25.
- 52.8 Table 2-12A of the final PRLA EA lists the distribution of the recorded sites within the 26 PRLAs. Table 2-13A of the final PRLA EA provides data on the cultural/temporal affiliation of the known site components in the PRLAs. PRLA numbers NM-3752, NM-3753, NM-3754, NM-3755, NM-3835, NM-3836, NM-3837, NM-3918, NM-3919, NM-6802, NM-6803, NM-6804, NM-7235, NM-8128, NM-8129, NM-8130, NM-8715, NM-8745, NM-9764 and NM-11670 are within ten miles of Chaco Culture National Historical Park (including the detached Pueblo Pintado).
- 52.9 Analysis of the effectiveness of the committed mitigation measures may be found in Chapter 3 under each of the resources analyzed in the Noncompetitive Coal Lease Issuance Alternative.
- 52.10 See the response to comment 48.17.
- 52.11 By this stipulation on the lease the effected coal operators will be responsible for demonstrating during mine plan preparation and approval subsidence prevention measures by geotechnical engineering methods. Such methods have successfully been applied in the past to critical mine areas like entrances and highways.

- 52.12 The requirement for a mitigation plan will be included in the standard lease form and is discussed under Committed Mitigation Measures in the Second DEIS (page 1-17). This is called for in the Programmatic Memorandum of Agreement among the Department of Interior, BLM, OSM and USFS and the Advisory Council on Historic Preservation regarding the Federal Coal Management Program. Part IC3 of this agreement states: "A lessee or designated representative will be required to develop cultural resource mitigation measures which will be included as part of a mine plan submittal." It should be noted that the mitigation plan will also be approved by the BLM and SHPO along with the BIA when Indian lands are involved.
- 52.13 See the responses to comments 11.4 and 31.11.
- 52.14 The statement must be taken in context with the remainder of this stipulation, which is the replacement of water. Specific sources that may require replacement will be identified at the mine plan stage of the leasing process by regulatory agencies.
- 52.15 Any costs relating to the mitigation of sacred sites will be borne by the lessee.
- 52.16 Presently the Bisti/De-na-zin Area is identified only as a potential Area of Critical Environmental Concern (ACEC). Management protection is presently provided through the Interim Management Policy for lands under wilderness review which satisfy the guidelines for protection of potential ACECs. A special management plan would be developed after an area is designated. As applied to mining, additional stipulations can be applied once a mine plan is submitted and a more detailed analysis can be made.
- 52.17 NEPA did not intend that identification of the financial cost of alleviating environmental costs is required in the EIS. CEQ in fact recognizes that compliance with NEPA is accomplished through documents in addition to the EIS. Therefore, the matter of costs of compliance will be dealt with in the Record of Decision.
- 52.18 As was noted in the response to comment 31.1, alternatives are various proposals to a specific action. The PRIA Alternative(s) are concerns with issuing leases for PRIAs, and only if commercial quantities of coal are proven. A determination that commercial quantities exist is made after the costs for implementing mitigating measures and stipulations has been taken into account. It is acknowledged that the costs associated with mitigation could result in there not being a finding of commercial quantities of coal. In this case, the No Action Alternative would be selected for these PRIAs.
- 52.19 This alternative is found on pages 1-6 and 3-53 of the EIS.
- 52.20 A PRIA tract-specific analysis has been completed and is included in Appendix A. The BLM has considered exchanges or alternatives to lease issuance for all PRIAs. The record of decisions will discuss whether a PRIA will be leased or whether an alternative to leasing will be chosen.

18 November 1983
Albuquerque, N.M.

Mr. Charles W. Luscher, State Director
Bureau of Land Management
Caller Service 4104
Farmington, New Mexico 87401

Dear Mr. Luscher:

I would like to thank the Bureau of Land Management (BLM) for the opportunity to submit written comments concerning both the Final San Juan Basin Cumulative Overview and Comment Letters (CO) of September 1983 and the Second Draft San Juan River Regional Coal Environmental Impact Statement (Second Draft SURROL-EIS) of October 1983. As an anthropologist, I have conducted numerous ethnohistorical research projects throughout the San Juan Basin in association with cultural resource management studies since 1976. In addition, I have had the privilege to do research about the wide range of Navajo sacred sites and localities of cultural significance in the New Mexico Generating Station study area and elsewhere. A technical report prepared by the Quivira Research Center of Albuquerque in association with Woodward-Clyde Consultants (Condie and Knudson 1982) presents the results of the New Mexico Generating Station study area research. The Cultural Resources Technical Report was used in the preparation of the Draft Environmental Impact Statement of Public Service Company of New Mexico's Proposed New Mexico Generating Station and Possible New Town issued by the BLM in November of 1982.

Undoubtedly, comments submitted by others prior to the 21 November 1983 deadline will be voluminous so I will limit my own comments to only two of the many important issues discussed in the two documents currently under review: BLM compliance with Public Law 95-341, a Joint Resolution of the 95th Congress concerning American Indian Religious Freedom and the potential applicability of Unsuitability Criteria under regulations for the management of federally owned coal, 43 CFR 346.1; and, the removal and relocation of Navajo residents and land users from Preference Right Lease Area (PRLA) tracts to facilitate the surface and subsurface mining of coal, as well as related land disturbing activities that are part of the San Juan Basin Action Plan (SUEAP).

BLM Compliance with the American Indian Religious Freedom Act (AIRFA) and the Unsuitability Criteria of 43 CFR 346.00:

Numerous individuals and organizations including, but not limited to, the Chairman of the Navajo Nation, Peterson Zah, various Eastern Navajo Agency Chapters, the Eastern Navajo Land Commission of the Navajo Tribal Council, the Rio Grande chapter of the Sierra Club, and the New Mexico Archeological Council have raised the issue of BLM compliance with AIRFA in written comments and resolutions according to the CO and the Second Draft SURROL-EIS.

The BLM responses to this issue in the two documents under consideration appear to be inconsistent, if not contradictory. I recommend that the BLM consider the following comments in preparation of the Final San Juan River Regional Coal Environmental Impact Statement. The following assertion appears in the CO:

The BLM has complied with the American Indian Religious Freedom Act by consulting with Native American traditional religious practitioners, attempting to identify religious sites, and considering and adopting stipulations to protect religious sites, graves, and gathering areas (CO-20).

However, in contrast to the above statement, the following statement is included in the Second Draft SURROL-EIS:

Sacred sites while identified are not to our knowledge afforded protection under 34 CFR 346.1.1 (sic, correct number is 43 CFR 346.1) (Unsuitability Criteria) of the Joint Resolution on American Indian Religious Freedom Act (sic). Until such time as the Bureau is directed to do otherwise, sacred sites will be identified, but not declared unsuitable for surface mining. However, at least 180 days prior to conducting coal mining operations, the Lessee is required to contact the Navajo Nation, the Medicine Men's Association, and the Navajo Chapter to provide an opportunity to conduct mitigatory actions for sacred and sensitive areas (4-135).

On the one hand, the BLM statement in the CO asserts compliance with AIRFA through consultations with traditional religious practitioners and the consideration of adopting stipulations to protect sites and localities of cultural significance to Native Americans. On the other hand, the BLM asserts in the Second Draft SURROL-EIS that "sacred sites" are not afforded protection under either the Unsuitability Criteria of Regulations Pertaining to Coal Management of Federally Owned Coal (USDI, BLM, 43 CFR 346.00) effective 6 August 1979 or the Joint Resolution on American Indian Religious Freedom (PL 95-341) of 11 August 1978. While it is obvious that the BLM has initiated steps in the direction of compliance with the spirit of AIRFA, full compliance will necessitate the adoption of management policies that incorporate a process through which in-situ preservation is considered as a way of protecting sites and localities of cultural significance to Native Americans from destruction by land disturbing activities. In the absence of a commitment to protect and preserve selected sites and localities of this type, efforts such as consultations with traditional practitioners, the identification of sites and localities of cultural significance, and "mitigatory actions" will not necessarily constitute compliance with PL 95-341.

53.1

Although the BLM indicates that a "directive" is necessary before sacred sites would be declared unsuitable for surface mining, PL 95-341 has already provided a mandate to all Federal agencies to "protect and preserve Native American religious cultural rights and practices." Other Federal agencies, notably the National Park Service (NPS) have begun to formulate management policies for AIRFA compliance that may serve as a guide to the

BLM, as I will discuss further below. At this point, I would like to question the BLM appraisal of protection afforded so-called "sacred sites" under BLM Regulations Pertaining to Coal Management.

I would like to commend those individuals responsible for assembling the Second Draft SURCL-EIS for including Section 3061.1 "Criteria for assessing lands unsuitable for all or certain stipulated methods of coal mining" of 43 CFR 3000(USDI, BLM, 1979) as Appendix A-10 in the Second Draft SURCL-EIS (pp. A-78 to A-80). On the basis of my review of the criteria, there are two criteria out of the total of twenty that may afford protection to certain sites or localities of cultural significance to Native Americans under special circumstances. The potential applicability of these two criteria might appropriately be mentioned in the main text of the Final Draft of the San Juan River Regional Coal-EIS. Unfortunately, the current Second Draft of that EIS excludes the applicability of any of the Unsuitability Criteria as shown in the quote given above.

The first potentially applicable Unsuitability Criterion in Criterion Number 7:

All districts, sites, buildings, structures, and objects of historic, architectural, archeological, or cultural significance on Federal lands which are included in or eligible for inclusion in the National Register of Historic Places, and appropriate buffer zone around the outside boundary of the designated property (to protect the inherent values of the property that make it eligible for listing in the National Register) as determined by the surface management agency, in consultation with the Advisory Council on Historic Preservation and the State Historic Preservation Office shall be considered unsuitable(USDI, BLM, 1979:32).

I have outlined elsewhere the wide range of sites and localities that are of cultural significance to Navajos(York 1982: 3-221 to 3-301). Included among the universe of sites and localities known to be used in association with Navajo curing ceremonies are prehistoric and historic archeological sites located in the San Juan Basin that are eligible for nomination to the National Register of Historic Places. In addition to inherent scientific, architectural, or historic values, sites such as Anasazi ruins used by Navajos as shrines or offering points for the deposition of blessed artifacts and Navajo sites used for ceremonial events are known to have cultural significance to contemporary Native Americans. The co-occurrence of cultural importance to the Navajos and the values embodied in the criteria of the National Register of Historic Places indicates that some areas and possible historic districts on tracts of land that may ultimately be affected by the SJRAP could qualify for nomination to the National Register of Historic Places. In the absence of a complete archeological inventory of all PRLA tracts it is not possible to dismiss the applicability of Criterion Number 7 for "sacred sites", as the Second Draft of the SURCL-EIS does. A complete archeological inventory supplemented with ethnographic information may yield the identification of National Register quality sites that are also "sacred sites".

53.2

Comments made in Appendix A-11, "Cultural Resources Inventory Procedures and Consultation" of the Second Draft SURCL-EIS(pp. A-81 to A-84) indicate

that the BLM recognizes the potential applicability of Criterion Number 7. Unfortunately, the main text of the Second Draft EIS does not reflect the comments made in Appendix A-11. I would like to advise you to consider revising the text on page 4-135 to reflect the information presented in Appendix A-11. The following statement is not represented in the text as written:

53.3

... it is possible that some cultural resources will be of special significance to local Native American people, thus deriving importance from factors which are not apparent during a standard archaeological resources inventory. Presently three such situations are known in the San Juan Basin. To address this possibility, the lessee will conduct an ethnographic survey specifically directed toward identification of properties which have special significance to local Native American people, which should be considered further in light of Federal historic preservation mandates. Results of this survey will be used in the development of special tract specific lease stipulations (p. A-84).

The second Unsuitability Criterion of 43 CFR 3061.1 that might conceivably afford sites and localities of cultural significance to Native Americans with protection is Criterion Number 20. It reads:

Federal lands in a state to which is applicable a criterion(i) proposed by that state, and (ii) adopted by rulemaking by the Secretary, shall be considered unsuitable(USDI, BLM, 1979:34).

One interpretation of this criterion is that the State of New Mexico could propose protection of sites and localities of cultural significance to Native Americans if it sought to do so. With appropriate rulemaking, the Secretary of the Interior could then extend protection to specific sites and localities not currently afforded protection under any other criteria of the Regulations Pertaining to Coal Management.

In summary, the possible applicability of both Criterion Number 7 and Criterion Number 20 should be entertained in the Final Draft of the

53.4

SURCL-EIS.

With reference to the American Indian Religious Freedom Act, it is my understanding that Public Law 95-341 directs all Federal agencies to protect sacred sites. The text of the 1978 Act reads as follows:

... henceforth it shall be the policy of the United States to protect and preserve for American Indians their inherent right of freedom to believe, express, and exercise the traditional religions of the American Indian, Eskimo, Aleut, and Native Hawaiians, including but not limited to access to sites, use and possession of sacred objects, and the freedom to worship through ceremonial and traditional rites(92 STAT 469).

Although PL 95-341 does not include specific enabling legislation, it concludes the following in Section 2:

The President shall direct the various federal departments, agencies, and other instrumentalities responsible for administering relevant laws to evaluate their policies and procedures in consultation with native traditional religious leaders in order to determine appropriate changes necessary to protect and preserve Native American religious cultural rights and practices(92 STAT 470).

On 26 November 1982, the National Park Service of the United States Department of the Interior issued a draft version of a Native American Relationships Policy in the Federal Register(Federal Register 1982). In the draft document, the NPS attempts to establish a management policy with reference to the mandate established by ALFPA. To my knowledge, the BLM has not yet issued such a document. In lieu of such a document, the BLM indicates in the CO and elsewhere that it is "considering and adopting stipulations to protect religious sites, graves, and gathering areas"(CO-20). In the absence of a management policy such as that instituted by the NPS, it would seem to be appropriate for the BLM to present "stipulations" that may be used on a "tract specific"(see above quote) basis for public review and comment. This would be a service to Native Americans who reside in the San Juan Basin, the public at large, and the various corporate entities that hold PRLA's. I would like to suggest that examples of such stipulations might appropriately be included in an Appendix of the Final Draft EIS.

53.5

My comments are an attempt to point out problems in the Second Draft SURRCL-EIS with reference to ALFPA compliance and the full use of existing regulations that may afford protection to sites and localities of cultural significance. An explicit problematic assumption in that document is that the "conduct of mitigation actions for sacred and sensitive areas" will fulfill the obligations the BLM has to Native Americans(4-135, as quoted above). It is patently false that such "mitigatory action" is universally appropriate in lieu of in-situ preservation and protection from land disturbing activities. Revisions such as those I have recommended above would indicate that the BLM is intent on moving in the direction of complying with the mandate of ALFPA and insuring that PRLA lease holders are informed of their responsibilities. In that regard, I recommend that the complete text of the Joint Resolution on American Indian Religious Freedom, PL-95-341 be added to the Final Draft of the SURRCL-EIS as an Appendix.

53.6

The Removal and Relocation of Navajo Residents and Land-users from PRLA Tracts:

The second issue that I wish to comment upon briefly concerns the displacement of Navajo residents and land users that will be caused by the various alternatives of the SJRAP. BLM responses to the concerns expressed by many interested parties, including the Navajo residents of the San Juan Basin, fail to show an adequate appreciation for the history of Navajo land tenure, the history of Federal Indian policy in the off-reservation region, and the drastic effects of forced relocation on Native peoples. Specific responses given by the BLM on pages 4-129 to 4-135 do not adequately address many crucial questions. For example, it is an abrogation of responsibility to provide no meaningful answer to the question about where people will be relo-

cated to. The BLM is afterall the land management agency for Federal land in the Basin, and has been involved in the administration of grazing activities for many years. The Final Draft of the SURRCL-EIS would benefit from a critical review of all answers provided in the section concerning relocation.

I trust that you have found these comments helpful. I would like to request a written response to my specific recommendations.

Respectfully,



Fred York
1712 Richmond Dr. N.E.
Albuquerque, N.M. 87106
(268-4285)

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1982 The Cultural Resources of the Proposed New Mexico Generating Station Study Area, San Juan Basin, New Mexico. Quivira Research Center Publication 39. Albuquerque, N.M.

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1982 Department of the Interior, National Park Service, Native American Relationships Policy: Management Policy. Volume 47, Number 228, Friday, November 26, 1982.

USDI, BLM

1979 Regulations Pertaining to Coal Management, Federally Owned Coal, 43 CFR 3400. Circular No. 2449.

York, Frederick F.

1982 "The Results of the Ethnographic Survey: A Sample of Significant Localities within the NMCS Study Area and Vicinity" IN Condle and Knudson, cited above.

CC: Members of the New Mexico Congressional Delegation
Governor Anaya
New Mexico Archeological Council



54

SF Coal Corporation

P.O. Box 3988
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505/282-2221

November 21, 1983

State Director
U. S. Bureau of Land Management
Caller Service 4104
Farmington, New Mexico 87401

Dear Sir:

SF Coal Corporation (SFCC) offers the following general comments with regard to the Second Draft San Juan River Regional Coal Environmental Impact Statement. Specific comments are contained in the enclosure to this letter.

SFCC is a subsidiary of Santa Fe Industries, Inc. We are currently engaged in developing the Lee Ranch Mine which is expected to commence coal deliveries by October, 1984. At the present time about 175 persons are employed in the construction activities, over 80% of whom are from the Grants-Milan-San Mateo area. Our Lee Ranch Mine is permitted for production of 5 million tons of coal per year, at which level over 400 persons will be employed by 1987. The Lee Ranch Mine represents an initial capital investment by SFCC of nearly \$80 million and by 1987, when production is expected to peak, wages and fringe benefits will total approximately \$15 million per year. The Lee Ranch Mine will provide the basis for long-term, stable employment in the greater Grants area.

The coal to be mined from Lee Ranch will be delivered primarily to electric utilities, largely situated in the southwestern United States. SFCC has signed long-term contracts to deliver coal to Tucson Electric Power Corporation's Springerville, Arizona Generating Station, as well as to Plains Electric Generation and Transmission Cooperative's Escalante Generating Station near Fruitt, New Mexico. Other electric utilities and industrial users from southern California to Texas are building or are planning to build coal-fired power plants by the early 1990's, and they are actively seeking suppliers of coal for their future generation demands.

Because there is this very real demand for coal by regional electric utilities, SFCC believes the Department of the Interior must lease sufficient coal to meet the demands of national energy security and to assure healthy competition in the coal industry. The leasing targets selected by the Secretary of the Interior are of critical importance to enable the coal industry to meet these needs. Without adequate reserves being made available for lease in the early 1980's, coal availability and competition in later years among mining companies will suffer, especially if new companies are prevented from entering the market by the holders of existing leases and PRLA's. The resultant lack of competition would carry over to reduce the number of options available to utilities and other coal users and will in the end, result in higher costs for the individual consumer, the end user of the electricity or other products produced from use of this coal.

 A Santa Fe Industries Company

Responses to comment letter #53.

- 53.1 See the response to comment 9.3.
- 53.2 The cultural resource stipulation on pages 1-16 through 1-18 requires ethnographic studies and provides for in-situ preservation of sites during mine plan analysis.
- 53.3 The comments and responses in the Second Draft will not be repeated in the Final. However, the statement from Appendix A-11 is reflected in the cultural resources stipulation on page 1-18.
- 53.4 The State of New Mexico did not wish to declare any areas as unsuitable per their option under Criteria No. 20. Criteria No. 7 has been applied along with the exceptions and exemptions on known cultural sites within the PRLAs and competitive leasing tracts.
- 53.5 Provisions are made for further mitigating steps to protect cultural resources on the Standard Lease Form (Appendix 1, Sec. 31) on pages 1-16 through 1-18, under Committed Mitigation and page 3-87 under Additional Mitigation. "Tract" or site-specific stipulations are more appropriate as part of the approved mining and reclamation plan when more specific impacts are known.
- 53.6 The BLM has a management policy designed to protect and preserve for American Indians their inherent right of freedom to believe, express and exercise their traditional religions. It is well documented and illustrated that the BLM has: 1) evaluated its policy with the aim of protecting American Indian Religious Freedom; 2) refrained from prohibiting access to, possession and use of religious objects and performance of religious duties and, 3) diligently consulted with the Tribe, BIA, and individual Indians on actions affecting religious exercise. A copy of the Joint Resolution on American Indian Religious Freedom, PL-95-341, is on file at the BLM State, District, and Resource Area offices.

State Director
November 21, 1983
Page -2-

SFCC urges that all increments of new federal coal production from the San Juan Basin not be consumed by existing leases and PRLA's. To do so would be anti-competitive and would favor old leases without acknowledging the environmental, economic, and social disruption in the area of these old leases or PRLA's which would make leasing in new areas more desirable.

The diverse land use conflicts in the San Juan Basin are well known. Thus, we believe the McKinley County Exchange is an excellent example of a land planning tool which will generate competition for federal coal in an area virtually free of land use conflicts.

This exchange has been proposed by our affiliate, the Santa Fe Pacific Railroad Company. The resulting coal-for-coal exchange will be, as required by section 206 of FLPMA, an equal value exchange based on data supplied by Santa Fe and on data produced by the BLM's Economic Evaluation Unit in New Mexico. In connection with the Exchange and our nomination of tracts for Federal leasing, Santa Fe provided BLM with substantial proprietary drilling information regarding coal quality and quantity on our fee and State-leased lands, environmental data, and proof of surface owner's consent under SMORA. As a result of this information and our open participation with the BLM, the public, other mining companies, and the San Juan River Regional Coal Team in the Federal coal nomination and tract delineation process, the four tracts which Santa Fe had nominated for federal leasing were rated as having high to medium potential for development and leasing and are included within the preferred alternative under the Draft Environmental Impact Statement for the San Juan Basin sale. The extensive proprietary data Santa Fe supplied will be available to the public once the tracts are made available for lease, whether or not the McKinley County Exchange is approved. This completely refutes the allegations sometimes made by our competitors that owners of land grant properties could possess an unfair advantage over others in checkerboard areas because of their unique knowledge of the coal potential of the areas gained by exploratory work on their own lands.

The McKinley County Exchange will be an important supplement to federal leasing. BLM will gain two solid blocks of coal with high potential for leasing. SFPRR will be able to consolidate coal within and adjoining its mine permit area into a unified mining unit.

The two federal tracts to be created by the Exchange are expected to offer high interest to prospective bidders for the following reasons:

- o While the coal tonnages to be exchanged are approximately equal (the BLM will receive about 98 million tons and SFPRR will receive about 101 million tons), the two federal tracts will have a stripping ratio of 7.9:1, while the private tract will have a ratio of 9.3:1. The lower stripping ratio on the federal tracts should be especially attractive to bidders;

State Director
November 21, 1983
page -3-

- o The federal tracts will be located close to rail transportation;
- o The coal offered to the Federal Government by SFPRR constitutes coal reserves proven by extensive drilling, the results of which will be available to all bidders. SFPRR in turn will receive coal resource estimated on the basis of relatively sparse drilling on Federal lands;
- o The Exchange would allow increased conservation of the total coal resource by permitting the mining of unified logical mining units in a more efficient and environmentally sensible manner;
- o The Exchange will make available federal coal in an area remarkably free of the environmental and land use conflicts affecting other federal lease tracts, leases, and PRLA's in the San Juan Basin. For instance, since the federal tracts are on private land (with surface owners' consent), no Navajo Indians would have to be relocated prior to mining. Nor would there be conflicts with Chaco Culture National Historical Park or its outlying ruins, BLM Wilderness Study Areas, or other areas significant for their archaeological or paleontological resources.
- o The Exchange has received widespread public support from such diverse parties as:

The Sierra Club
Pro-energy advocacy groups
U.S. Fish and Wildlife Service
New Mexico Commissioner of Public Lands
New Mexico Energy and Minerals Department
New Mexico Department of Commerce & Industry
New Mexico Department of Natural Resources
Local governments
Concerned citizens

These groups all support this exchange because it makes sense as intelligent land management. It will result in the production of needed fuel from an area virtually free of environmental and land use conflicts. It will also generate employment in a high unemployment region of New Mexico.

Predictably, this Exchange has not received support from companies with whom Santa Fe will compete and which operate existing mines or which hold PRLA's. Some of these companies, individually and through such organizations

SF COAL CORPORATION'S COMMENTS TO THE "SECOND DRAFT
SAN JUAN RIVER REGIONAL COAL ENVIRONMENTAL IMPACT STATEMENT"

A. Interrelationships with Other Projects in the Region, page 1-29

Under the heading "Santa Fe Exchange" the company referred to as proposing the exchange is "Santa Fe Pacific Railroad Mining Company." The correct name for the corporate entity proposing the exchange is the Santa Fe Pacific Railroad Company.

B. Water Quality, page 1-32

Under the comparison of the impact of the alternatives of PRLA's, it is implied that all surface coal mining activities would generate acidic runoff. The Lee Ranch Mine, as one of its conditions of operation, will produce no surface water discharges from disturbed or unclaimed areas. Such runoff, if any, will be contained within the permit area.

C. Wildlife, page 1-33

This summary indicates that surface mining would have no beneficial effect on wildlife. However, successful reclamation at the San Juan Mine has shown that increased vegetative cover resulted in small mammal and raptor populations greater than those found under pre-mining conditions.

D. Geologic Hazards, page 2-3

The discussion of ground subsidence which has occurred in the Ambrosia Lake area, a region eight miles southwest of the Lee Ranch tracts, erroneously implies that this subsidence will adversely affect coal mining operations. Any hazards associated with subsidence in the Ambrosia Lake area will have absolutely no adverse effect on any coal leasing or coal mining activities elsewhere in the San Juan Basin. It is erroneous to imply so. This misleading reference to subsidence at Ambrosia Lake as a geologic hazard which would affect coal mining activities should be removed from the final EIS.

E. Table II-9, page 2-35

The data given for the Lee Ranch Middle and Lee Ranch West tracts does not reflect the inventory performed at BLM's request by the School of American Research in July, 1983. The "percent inventoried" and "site component affiliation" data should be updated to reflect information provided BLM on July 25, 1983.

F. American Indian Concerns, page 3-23

The final EIS should contain a listing of those tracts and PRLA's from which no American Indians would be forced to relocate as a result of surface mine operations.

G. Recreation, page 2-42

In order to complete the discussion of the Continental Divide National Scenic Trail (CDNST), it should be pointed out in the final EIS that the management scenario which the CDNST Advisory Council has adopted provides that "CDNST may be routed through a variety of resource uses and activities and will not preclude resource management adjacent to the trail." Therefore, surface mining activities would not "disrupt" the trail location unless the trail was subsequently planned to go directly through a mine. In addition, Fernandez Company, Ltd. is on record with the U. S. Forest Service opposing construction of any portion of CDNST across lands owned by the Fernandez Company, Ltd. Since such private lands are exempt from condemnation procedures it is unlikely that surface coal mining operations in the Lee Ranch area would be adversely affected by CDNST, or vice versa.

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State Director
November 21, 1983
Page -4-

as the National Coal Association and the Mining and Reclamation Council of America, have expressed their opposition to this exchange on the grounds that it is "anticompetitive" and in violation of the "spirit" of Section 2(c) of the Mineral Leasing Act of 1920.

While the McKinley County Exchange will create a more efficient mining unit at the Lee Ranch Mine and therefore be procompetitive, it also will permit other coal producers to have the opportunity to enhance their competitive positions by bidding on larger tracts of blocked up Federal coal, with the result that competition will be further stimulated. This result could only be called "anticompetitive" in the distorted sense that these companies use that term; i.e., to mean any action that would mean increased competition with them. This is the kind of economic protectionism that the law tries to prevent, not to promote.

Section 2(c) plainly has no application to FLPMA Section 206 exchanges. In enacting Section 2(c), Congress simply restricted the leasing of federal coal to railroad companies; it did not restrict any other method of transferring federal coal to mining companies indirectly affiliated with the railroads.

As Deputy U. S. Attorney General William F. Baxter testified before the Commission on Fair Market Value Policy for Federal Coal Leasing on November 17, 1983, "Statutory or regulatory restraints on free market forces in coal -- as in other markets -- should be no broader than necessary to achieve important public goals."

Thank you for this opportunity to comment.

Very truly yours,



G. G. Byers
Manager-Governmental Affairs

GGB:gem
Enclosure

Responses to comment letter #54.

54.1 The text has been revised

54.2 Although some reduction in pH of surface runoff from existing mines has been documented (see page 3-13 of the Second Draft San Juan River Regional Coal EIS), it was not intended to imply that this would occur in every case. Eliminating or reducing surface water discharges would mitigate this potential impact.

54.3 It is agreed that after successful reclamation, an increase in the small mammal population would occur, and as a result, there would be an increase in the raptor population. However, it is felt that the impact to the small mammals will be negligible; therefore, they were not discussed in the document.

54.4 The statement made on page 2-3 merely says that ground subsidence has occurred as a result of underground mining in the Ambrosia Lake Uranium District and that this area is located approximately five to six miles south of the Lee Ranch tracts. It does not imply that subsidence from coal mining operations would occur at the Lee Ranch tracts, nor does it imply that subsidence from uranium mines will affect coal mining at Lee Ranch.

54.5 Table 2-9 of the Second DEIS does include data provided to the BLM by the School of American Research from their 1983 sample surveys in the Lee Ranch Middle and Divide tracts. The School of American Research did not conduct any survey in the Lee Ranch West tract during their 1983 sample survey. Table 2-9 has been changed to show the correct number of sites in the Divide tract.

54.6 The PRIA tracts which are listed by number and the competitive tracts shown by name contain occupancies which may need to be relocated (Appendix F-1, F-2 and F-3). The remaining tracts contain no occupancies to relocate; therefore, a separate listing is not necessary.

54.7 The text within the Recreation Section, Chapter 2, pages 2-42 and 2-44 have been revised to clarify the principles and criteria concerning the Continental Divide National Scenic Trail. Also see the response to comment #6.4.



Forest
Service

Region 3

517 Gold Avenue, SW.
Albuquerque, NM 87102

Reply to: 1950

Date: NOV 16 1983

Mr. Charles W. Luscher
Bureau of Land Management
900 N. La Plata Highway
Callee Service 4104
Farmington, NM 97401

Dear Mr. Luscher:

Thank you for allowing us the opportunity to review the second draft of the San Juan River Regional Coal Environmental Impact Statement. We noted that this document also contained a summary of the cumulative overview, including the interaction of the proposed coal development, the New Mexico Generating Station, and the wilderness study proposals.

We have reviewed this document and we have no additional comments or recommendations.

Sincerely,

James C. Overbay
JAMES C. OVERBAY
Deputy Regional Forester

No substantive comments in letter #55.





56

Albuquerque Wildlife Federation

1914-1952 GAME PROTECTIVE ASSN. / 1952-1972 ALBUQUERQUE WILDLIFE & CONSERVATION ASSN. / 1973 ALBUQUERQUE WILDLIFE FEDERATION
ORGANIZED BY SPORTSMEN IN 1914 TO PROTECT AND PERPETUATE
OUR WILDLIFE AND NATURAL RESOURCES

P. O. Box 1234
Albuquerque, New Mexico 87103



November 21, 1983

State Director
Bureau of Land Management
Caller Service 4201
Farmington, New Mexico 87401

Dear Sir:

The following comments and suggestions on your Second Draft; "San Juan Regional Coal Environmental Impact Statement" are made in behalf of the Albuquerque Wildlife Federation. We are pleased to have this privilege.

First and foremost we congratulate you and your staff on the excellent Draft. We believe you have covered the features we are primarily concerned with very well.

Our general comments include the following:

1. Minimize the areas to be disturbed in the mining and milling operations. Have reclamation standards that will place these areas in as nearly as possible in the condition they were before disturbance.
2. Allow buffer zones for game animals and birds habitats. This would be to provide protection for the native species.
3. Due consideration must be made of the effect mining operations including power plants will have upon air and water quality. The potential damage to both air and water quality must be minimized to the limit of economic capabilities.
4. Minimize area to be strip mined and maximize reclamation of all disturbed areas.

Direct References to Draft report:

- 1-25 Agree with revegetation policy. A very important phase of revegetation is in the management of the areas in order for them to be kept on a sustained yield basis.
- 1-27 Big game has been properly recognized and treated as an part of the natural resources.
- 1-30 The Ute Mountain Exchange should be a real advantage for wildlife.
- 1-32 Vegetation for livestock must be managed so as to maintain the grazing capacity. This is especially important to the Indians.
- 1-39 Keep disturbance of game habitat to a minimum.
- 2-33 More research on wildlife habitat is needed before introducing mining in many areas.
- 2-39 Include all areas listed in the wilderness system. Wilderness status needed to provide protection in key wilderness areas.

Affiliated With The National Wildlife Federation

--2--

- 3-9 In the last paragraph, 8 lines down concerning grazing. These areas surely have been grazed in the past.
 - 3-11 Last paragraph. This is the way reclaimed areas should be managed and should apply to all areas.
 - 3-17 More study is needed for wildlife.
 - C-1 Under pinyon Juniper type, every effort should be made to preserve these and managed to provide a sustained fuel wood supply for the public.
 - C-2 Same as for P-J type. This would also include other forest products.
- Under transportation, all roads should be constructed and maintained to a standard to prevent erosion.

In conclusion, we believe you have covered the issues involved very well. Under the General Comments section it appears you have given these adequate consideration.

We appreciate the opportunity to review this document and trust our comments may be of value to you.

Yours sincerely,

E. Lavelle Thompson
E. Lavelle Thompson
for

Robert Nordstrom, President
Albuquerque Wildlife Federation

No substantive comments in letter #56.

57

THE NAVAJO NATION

WINDOW ROCK, NAVAJO NATION | ARIZONA | 86515



PETERSON ZAH

CHAIRMAN, NAVAJO TRIBAL COUNCIL

EDWARD T. BEGAY

VICE CHAIRMAN, NAVAJO TRIBAL COUNCIL

DISK: MEMLTR

Comments on the Surface- and
Ground-water Resources Pertaining
to the Second Draft of the San Juan
River Regional Coal Environmental Impact
Statement

November 16, 1983

Mr. Charles W. Luscher
State Director
Bureau of Land Management
Caller Service 4104
Farmington, New Mexico 87401

Dear Mr. Luscher:

Attached are comments pertaining to the surface- and ground-water resources which will be affected by proposed coal development in the San Juan region. These comments are based on the information available within the second draft of the San Juan River Regional Coal Environmental Impact Statement.

We appreciate the opportunity to review and comment on this draft.

Sincerely,

THE NAVAJO NATION

Peter Deswold, Jr.
Peter Deswold, Jr.
Executive Director
Division of Water Resources

msh

Attachment

4-129

Submitted by:

DIVISION OF WATER RESOURCES
The Navajo Nation

Contributions by:

Masud Zaman, Geohydrologist, Water Management Department
Stephen Bernath, Surface Water Hydrologist, Water Mngmt. Dept.

November 17, 1983
Window Rock, Arizona 86515

A general review of the Second Draft Environmental Impact Statement (DEIS-2) indicated that the 50 major questions raised previously by 64 parties which included federal, state and local agencies, the Navajo Tribe and the individual area residents (Navajo allottees and others) have covered most of the serious concerns regarding the impacts of a major coal development program on the water resources in the San Juan Basin (see DEIS-2 Table 4-5, Pages from 4-10 to 4-19). However, the responses and solutions to most of these questions are unsatisfactory. It should be made clear that the Navajo Nation does intend to exercise its right to review and approve water management, water use and water replacement plans affecting Navajo water and Navajo water rights.

The following are additional questions or comments regarding water resources:

1. A major comment is that the DEIS-2 makes no mention of the pending claims of Navajo, Jicarilla, and Ute Mountain Tribes and Navajo allottees to surface and groundwaters in the San Juan Basin and how these claims might affect or be affected by the major coal development projects in the Basin.
2. DEIS-2 makes no mention of the Navajo Nation's right to control, manage and allocate all waters (surface and ground) that originate on or flow through or under Navajo lands. The jurisdiction problem is a major concern of the Navajo Nation.

DEIS-2 does mention the total need for 12,850 AFY under

PRIA's and 3,700 AFY under SJRCL from groundwater withdrawals, but fails to discuss how existing users affected by these actions in the coal development areas are to be compensated. Also there is no mention or discussion of a source of replacement water for affected existing users.

4. DEIS-2 fails to mention the requirements for groundwater withdrawals to be used by the individual coal tracts, the impacts of groundwater withdrawals within and in the immediate vicinity of the individual tracts, their effects on the existing users (mostly Navajos), and how those users will be compensated, or have their water supplies replaced.

5. In the case of the major proposed coal development operations in the vicinity of the City of Gallup, DEIS-2 fails to mention how the City of Gallup's and the surrounding communities' water supplies will be impacted and offered no solution to the impacts. Water supplies in the Gallup Basin are already dwindling due to enormous withdrawals by existing uranium and coal mining operations, withdrawals by the City of Gallup for municipal and industrial uses, and withdrawals by surrounding communities and individual well owners. Additional withdrawals under the proposed coal development will further impact the ground water resources in the area.

The same inadequacy exists in regards to impacts on water supplies of the community of Crownpoint, where uranium and

coal mining operations and municipal, industrial and individual wells have already impacted groundwater resources, particularly in the Westwater Canyon member of the Morrison formation. Further withdrawals from this aquifer may cause severe water quality problems due to vertical leakage. Also, some of the existing water sources may go completely dry or static water levels may drop so low that the cost of pumping water will become unbearable. DEIS-2 does not clarify these problems, nor attempt to propose viable solutions to them.

57.6

6. DEIS-2 fails to discuss water quality problems in this study. It is important to note that underground fresh water only exists within or in the immediate vicinity of the recharge areas throughout the San Juan Structural Basin. Water quality deteriorates from fresh to brackish to saline as water moves away from the recharge areas towards the center of the Basin.

57.7

7. DEIS-2 does not provide any backup data to verify the validity of the USGS Digital Model (see Appendix B-11). All such data must be provided to the Navajo Nation for better review of the model.

57.8

8. DEIS-2 makes no mention of individual Navajo Indian allottees' concerns regarding impacts on surface and groundwater supplies and how they will be compensated or have their water supplies replaced.

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9. DEIS-2 makes no mention of the impact on shallow alluvium

57.10

57.10

water, which is the main potable groundwater source in several areas and a major source of livestock water. Surface coal mining operations disrupt these sources and severely degrade the quality of water for human and livestock consumption.

10. The additional proposed 15,000 AFY withdrawal from the Westwater Canyon member for NMGS and the 4,550 AFY withdrawal for the proposed "new town" will further impact groundwater quality and availability in the Morrison formation. The final DEIS should make clear the cumulative effects of all present and future proposed withdrawals on the Westwater Canyon member and their effects on the San Juan Basin.

57.11

11. Mitigating measures are not specified to support Assumption #3 in the Impact Analysis.

57.12

12. Local and Tribal regulations should be included as regulatory sources to be complied with in the first paragraph under Water Resources: Surface Water, p.3-12.

57.13

13. Under Water Resources: Surface Water Quantity, p.3-12, comments are made that there would be destruction of natural drainage patterns and existing stock tanks and playa lakes would be destroyed. In addition, streams would be diverted. However, no mitigating measures are discussed to reconstruct natural drainageways and water holding facilities after mining, as is required in SMCRA. Also, there is no mention of redirecting streamflow to the "original" channels.

57.14

14. In the first paragraph under Water Resources: Surface Water

57.15

Quality, p.3-13, the Navajo Nation should be recognized as have water quality regulatory authority.

15.

Due to increased probability of significant impacts occurring due to the failure of sediment ponds and wastewater treatment facilities from high intensity precipitation events, it may be appropriate to require more stringent design criteria and regulatory requirements on these proposed developments.

57.16

16.

The lack of mitigating measures mentioned on p.3-86 for water resources is deplorable, considering the fact that it is stated on p.3-99 that the lowering of water levels in aquifers and shallow ground-water sources would be irreversible and unretrievable, which is an unacceptable commitment of resources affecting the Navajo Nations waters.

17.

The response on p.4-71, #5.18, indicates that information about existing wells is too incomplete at this time to allow for site specific analysis. Is this an indication that the intent of the EIS is not to look at the site or specific analysis is the collection of this data from the appropriate sources not yet complete? The data does exist.

57.17

18.

If statements concerning run-off and sediment are speculative, as indicated in #5.25, p.4-73, how is DEIS-2 going to determine significant impacts and how they will be mitigated? How were the calculations regarding sediment production arrived at and what data, if any, was used?

57.18

CONCLUSION

As stated above, the Water Management Department of the Navajo Tribal government has serious concerns and questions regarding further proposed coal development in the San Juan Region. Until further mitigating measures are identified and agreed to, calculations of impacts verified, and specific information gained regarding water quantity and quality effects on the Navajo Nation, the "No-Action" alternative is recommended.

Office of Navajo Land Development 11-17-83

Comments on Second Draft of BLM's San Juan River
Regional Coal Environmental Impact Statement
dated October, 1983.

THE NAVAJO NATION

WINDOW ROCK, NAVAJO NATION (ARIZONA) 86515



PETERSON ZAH

CHAIRMAN, NAVAJO TRIBAL COUNCIL

EDWARD T. BEGAY

VICE CHAIRMAN, NAVAJO TRIBAL COUNCIL

pg. 4-31: 2.2;

The Navajo Tribe shall participate in all lease terms and special stipulations.

pg. 4-57: 4.12;

Specific land management plans, re: Reclamation on Navajo lands shall be approved by the Navajo Tribe.

pg. 4-65: 5.1;

Any appropriation of ground water resources on and under Navajo lands (surface & sub-surface water) shall be approved by the Navajo Tribe and a plan of replacement shall be submitted to the Navajo Tribe.

pg. 4-65: 5.2;

All Navajo water users rights shall be protected and the Navajo Tribe shall review and approve all water uses on Navajo lands within and adjacent to PRLA's and competitive lease tracts and including impacts on adjacent users. A full impact analysis shall be presented to the Navajo Tribe on tract by tract basis.

pg. 4-67: 5.9;

The BLM - EIS response is very inadequate and fails to respond to water uses.

pg. 4-67: 5.10; 5.13;

Any and all proposals to acquire surface and sub-surface water on Navajo lands shall be approved by the Navajo Tribe, including replacement plans.

pg. 4-69: 5.14;

The Navajo Nation shall approve all water management, water use and water replacement plans on all Navajo Tribal lands prior to any leasing or any type of permitting by any entity. BLM and any other entity shall comply with the Navajo Nation requirements and approval for all types of water appropriation on Navajo lands.

pg. 4-78: 5.48;

The EIS fails to address the need and requirement to obtain data and do an impact analysis on water supplies to local Navajo communities and Chapters. Also what impact and effects would the San Juan Basin water rights litigation and final settlement have on water resources. A Projection of water needs for local Navajos is needed for the duration of mining and reclamation. How would these water needs and uses both quantity and quality and the availability be assured.

pg. 4-81: 6.7;

The EIS fails to show the number and type of livestock and number of families who have ownership of stock. An analysis of the statistics per tract basis and the economic impact on the owners and the area should be published in the final EIS.

November 21, 1983

Mr. Charles W. Luscher
State Director
Bureau of Land Management
Caller Service 4104
Farmington, New Mexico 87401

SUBJECT: Comments on Second
Draft on San Juan River Regional
Coal Environmental Impact Settlement
October, 1983.

Dear Mr. Luscher:

Attached are comments on the above subject draft E.I.S.

Sincerely;

for Alfred Dehiya
Alfred Dehiya, Acting Director
Office of Navajo Land Development

57.19

AD/bja

57.20

pg. 4-84 and 85: 6.19;

Since all the major impacts will be on Navajo people whose primary use of the land economically is livestock production the Navajo Tribe requests a full socio-economic impact analysis on a tract by tract basis in relation to livestock production. Sheep and horses are sacred animals to the Navajo people. Sheep provide sustenance in the form of food-meat and milk; and bartered and traded for other goods or services; hides and lambs provide income. Wool is woven into rugs and blankets for home use and also traded and sold for money and other goods. Herding sheep provides employment and as an educational process for young people.

Horses provide transportation and are work animals for plowing fields, for roundups and herding. They are traded and sold for goods, money and services. The sheep and horses combined with other livestock form the basis of Navajo traditional economy and insure independence and survival. They are such a necessary part of life that they are carried in fetish form in medicine pouches and have special prayers, songs, and are included in the blessing way ceremonies.

pg. 4-117: 14.1 and 14.2;

Navajo preference in employment shall be stipulated in each mining plan with the full participation of the Navajo Tribe.

pg. 4-129: 15.1;

The Navajo Tribe strongly takes the position that a relocation impact and resettlement plan be implemented prior to any mining lease. BLM shall take the responsibility of acquiring replacement lands for Navajo resettlement and grazing. The lands shall be in trust. The federal government - BLM shall have the primary compensation responsibility to insure compensation for losses of landusers, including losses of the Navajo Tribe. The Navajo Tribe Impact and Resettlement policy ACD-163-80 (attachment A) applies in all relocation and resettlement of Navajo people.

pg. 4-135: 15.12;

The Navajo Nation is a qualified surface (sub-surface) owner and as such has the veto and consent power over all the Navajo Trust Lands, Fee Lands, Public Land, Order 2198 Lands, and other lands set aside for Navajo use and occupancy per 43 CFR Part 3400.5.

pg. 4-135: 15.13;

All Navajo Sacred Sites, places and sensitive areas shall not be disturbed, destroyed or altered. The procedure outlined in the SDEIS shall be followed.

pg. 4-136: 15.14;

All Indian occupants of public domain lands have rights of occupancy based on settled government policy (1) 43 CFR 2091.5 land occupied by Indians:

"Authorized officers will ascertain by any means in their power whether any public lands in their districts are occupied by Indians and the location of their improvements, and will suspend all applications made by other than the Indian occupants, upon lands in the possessions of Indians who have made improvements of any value whatever thereon."

(2) Indian right of occupancy and possession of public lands is supported by Supreme Court decision; Cramer V. United States 261 US 219, 1923. Displacement of individual Indian occupants of public lands shall receive in exchange such lands equal in size and value as lands they occupy.

pg. 4-139: 15.27;

Any relocation of Navajo people shall be in compliance with the Navajo Nation Impact and Resettlement Plan and Policy.

ACD-163-82

Attachment A

Class "B" Resolution
Area Approval Required.

RESOLUTION OF THE ADVISORY COMMITTEE OF THE NAVAJO TRIBAL COUNCIL

Establishing and Adopting the Navajo Impact and Resettlement Policy and Plan for Tribal Departments

WHEREAS:

1. Substantial numbers of Navajo people, not including the Navajos now residing on lands now partitioned to the Hopi Tribe in the Former Joint Use Area, currently face eviction from their homes and traditional dwellings as a result of economic and mineral development projects; and
2. It has been historically the practice of non-Indian developers to ignore the legal, moral and ethical obligations to communities and individuals located on large mineral deposits; and
3. All citizens and communities should be afforded the highest standards and commitments from tribal agencies in technical planning and environmental protection to minimize adverse affects to the sacred nature of Navajo land and for the protection to the health, safety and welfare of each Navajo citizen; and
4. As a sovereign nation, it is the responsibility of the Navajo Nation to reduce the negative effects of large scale development upon Navajo communities and to guarantee and to protect the rights of Navajos who are forced to resettle due to large scale development; and
5. Tribal departments need guidance, direction and assistance with obtaining lands for various projects, and to meet the requirements of various Federal and State agencies with regards to displacement of individuals in order to maintain authority to administer certain programs for future needs; and
6. The Navajo Tribal Council and Advisory Committee have approved and adopted the Navajo Nation Energy Policy Resolution CAP-34-80, which states "Adverse results from resource development shall be minimized and mitigated whenever and wherever possible and the resulting cost shall be borne by the developer of the resource; and the interests and needs of energy impacted Navajo communities shall be considered in all resource development"; and

Impact and Resettlement Policy and Plan
of the
Navajo Nation

Introduction:

The impact of large scale development projects and forced relocation resulting from these developments on host communities, has been the focus of considerable attention by the Navajo Nation. The social, economic and cultural impacts of such developments require considerable attention so that tribal developmental objectives and obligations will be met with a minimum of disruption to local residents and communities. Of particular importance is the need for executive direction. This requires the Chairman's Office to insure that developmental and relocation projects which impact Navajo communities and individuals are adequately being addressed by the responsible tribal departments in a timely fashion. In essence there is a need to specify an impact and resettlement policy and plan which delineates functions and responsibilities of the Navajo Tribal government as they apply to community and economic development and resettlement.

I. Purpose:

The purpose of the Impact and Resettlement Policy and Plan of the Navajo Nation lies within five broad areas:

1. To specify methods of reducing negative impacts of relocation and resettlement to both Navajo individuals and communities.
2. To emphasize the importance of executive direction in impact mitigation and resettlement.
3. To ensure that the potential economic and social benefits resulting from large scale developments are fairly shared by the tribe and the individuals and communities most directly affected.
4. To delineate tribal departmental responsibilities and to insure coordination between the various agencies for the planning and implementation of impact and resettlement measures.
5. To provide a basis for negotiation or renegotiation of lease agreements in order to reduce social costs and maximize benefits to the Tribe and impacted communities and individuals.
6. To provide for the creation of a uniform and consistent set of policies, rules, regulations and procedures which will satisfy the above purposes and which will satisfy displacement and resettlement regulations and requirements of Federal and State agencies and programs operating on the Navajo Nation.

II. Functions:

In order for the Navajo Tribe to adequately respond to developmental and relocation impacts in a timely fashion, it must develop an interdivisional

7. The Navajo Tribal Council and Advisory Committee have approved and adopted the Navajo Coal Mining Commission Plan of Operation Resolution ACJN-75-82: "Assuring that coal related activities within the Navajo Nation do not adversely affect the Navajo people and non-Navajo residing on land adjacent to the Navajo Nation."

NOW THEREFORE BE IT RESOLVED THAT:

1. The Advisory Committee of the Navajo Tribal Council hereby approves and adopts the Impact and Resettlement Policy and Plan of the Resources Division of the Navajo Nation, attached herewith as Exhibit
2. The Advisory Committee further directs the Chairman of the Navajo Tribe to direct the Office of Navajo Land Development and Department of Justice, along with other relevant agencies, to develop administrative procedures and regulations for carrying out the intents and purposes of the Impact and Resettlement Policy and Plan and to provide these to the Tribal Council for approval and adoption.
3. The Chairman of the Navajo Tribal Council shall submit proposed codification of these procedures and regulations to the Advisory Committee for passage within 90 days.

CERTIFICATION

I hereby certify that the foregoing resolution was duly considered by the Advisory Committee of the Navajo Tribal Council at a duly called meeting at Window Rock, Navajo Nation (Arizona), at which a quorum was present and that same was passed by a vote of 12 in favor and 0 opposed, this 17th day of December, 1980.


Vice Chairman
Navajo Tribal Council

* The right to fair, sanitary and appropriate housing

* The opportunity to pursue a meaningful livelihood

* The right of the relocatee, who relies on Navajo traditional economy as a livelihood and lifestyle to be compensated with alternative lands, similar in the amount and quality to land which the relocatee is forced to vacate.

* The right to share equitably in the economic benefits resulting from the developmental project.

Of particular importance is to insure the Navajo family is not disenfranchised and to insure that housing, appropriate to the individual and family being relocated, and of comparable or better quality, is provided as compensation for displacement. Also, when an affected customary land user is dependent upon livestock and/or farming as a means of livelihood, that individual or family shall be compensated with alternative lands. The Navajo Tribe shall be responsible for setting up the livestock operation and/or cropping plan for the affected land user.

III. Responsibilities:

Overall responsibility for addressing developmental impacts and resettlement problems is vested in the Chairman of the Navajo Tribal Council. The Chairman shall designate a member of his office staff to oversee the development of rules, regulations and procedures to implement the Impact and Resettlement Policy and Plan and to administer the planning and implementation of mitigation measures.

The Chairman or his representative shall be responsible for directing, coordinating, and monitoring of all developmental projects that impact on Navajo individuals and communities. More specifically, the Chairman's representative will:

1. Identify the priority impact and resettlement projects of the Tribal Chairman.
2. Delineate tribal department planning and implementation responsibilities for each program.
3. Direct and monitor Division directors in carrying out their responsibilities.
4. Establish time lines and completion dates for the responsible tribal departments for planning, implementation and relocation.

A. Impact Assessment and Planning Responsibilities: The Office of Navajo Land Development, Division of Economic Development and Division of Community Development shall enter into a memorandum of agreement to act as lead agencies for mitigating impacts and planning for resettlement programs:

-3-

approach. Coordination between tribal departments shall address the negative effects to impacted communities and be particularly sensitive to projects which involve the relocation of individuals and families.

A. Impact Assessment and Planning: Prior to signing any lease agreement or approving land withdrawal for large scale development (such as mineral leases) the various departments of the Navajo Tribe shall conduct an analysis to determine project costs and benefits (socioeconomic impacts) in terms of revenues and/or goods and services not only to the Navajos as a tribe but also to the communities and individuals that will be impacted. It should be noted that socioeconomic analyses are not limited to approved developmental projects, but will include existing developmental projects. Broad areas of impact consideration will include:

1. Economic
2. Natural Environment
3. Cultural and Aesthetic Values
4. Public and Private Services
5. Housing and Social Conditions
6. Other Impact Measures as appropriate

The appropriate tribal departments will then determine the developmental requirements for their respective planning and implementation responsibilities. More specifically, this will require tribal departments to develop a plan of action and set of standards for their respective areas of responsibility. These areas will include:

1. Economic
2. Environmental protection and natural resources development
3. Cultural and aesthetic programs and domestic water and sanitation development
4. Community housing and domestic water and sanitation development
5. Social services, health care, and educational need

In the development of an action plan, tribal departments shall not only identify the mitigation measures which their department is responsible for but will identify the costs for meeting these requirements and establish project priorities. In short what is required is a capital improvements program for each of the five major categories outlined above. Once the various departments have identified necessary mitigation measures and associated costs, the relevant tribal departments, as a whole, shall present this information to the impacted communities for their review and comment.

B. Resettlement Planning and Implementation: Many large scale projects, such as surface mining, necessitate the displacement and relocation of individuals. If this is necessary, the Navajo Tribe shall protect the following Navajo Rights:

* The right to fair and adequate compensation for loss of the surface use of the land, considering both economic and non-economic values within the Navajo context.

* The right to compensation for moving expenses.

-2-

4. The capital improvement programs by each division and department will be completed and approved by the respective Division directors within 60 days upon issuance of the directive from the Chairman of the Navajo Tribal Council or his representative, unless otherwise stipulated.
 5. The capital improvement programs for each division will be integrated into an interdivisional Action Plan finalized and approved through a memorandum of agreement by the executive directors of the Division of Community Development, Division of Economic Development and Division of Resources.
 6. Upon agreement as to the purpose, content, and priorities of the interdivisional Action Plan, and approval from the Chairman's representative, the respective division executive directors will direct their departments to the tribal priorities as outlined in the impact plan.
8. Resettlement Planning and Implementation Responsibilities: The responsibility for protecting the rights of individual Navajo land users falls upon the Tribe as a whole. But there are specific responsibilities vested in the Chairman's Office and on particular departments of the Tribe in supervising and administering resettlement of Navajo individuals, families and/or communities as outlined below:

1. Projects where relocation (displacement of people) is occurring or will be forthcoming will be identified by the Chairman's representative.
 2. Monitoring and general oversight of rights protection will be conducted by the Chairman's representative with the assistance of the Office of Navajo Land Development.
 3. The resettlement process will be jointly conducted by Technical Engineering Services Department, Housing Services Department, Planning Department, Department of Agricultural Resources, and the Office of Navajo Land Development of the Navajo Tribe.
- * The Office of Navajo Land Development shall assist with homestead leases, land withdrawals and in determining customary land users who are dependent upon livestock and/or farming, and will acquire land necessary to continue their means of livelihood and lifestyle.
- * The Planning Department shall assist in site selection, site design and preparation of community development plans, including community facilities.

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- * Technical Engineering Services and Housing Services Department shall assist in housing design and housing site selection and the Planning Department shall determine infrastructure requirements and develop a community development plan for individual resettlement.
- * The Department of Agricultural Resources shall assist in setting up livestock operations and/or cropping plans for customary land users dependent upon livestock and/or farming.

IV. Conclusion:

It is imperative that the needs of Navajo communities and individuals who sustain negative impacts for the benefit of all Navajo people be adequately addressed. Only through executive supervision and a delineation of departmental responsibilities (in consultation with impacted communities and individuals) can the Navajo Tribe effectively respond to impacted individuals and communities. Through the systematic and coordinated policy and plan outlined above, the Navajo Tribe will insure that Navajo individuals and communities are protected and negative effects are reduced.

THE NAVAJO NATION

WINDOW ROCK, NAVAJO NATION, ARIZONA 86515



PETERSON ZAH

CHIEF, NAVAJO TRIBAL COUNCIL

EDWARD T. BEGAY

VICE CHAIRMAN, NAVAJO TRIBAL COUNCIL

November 23, 1983

Mr. Bill Luscher, State Director
Bureau of Land Management
P. O. Box 1449
Santa Fe, New Mexico 87501

Dear Mr. Luscher:

We appreciate the opportunity to review the new Draft Environmental Impact Statement (DEIS). We commend BLM for its continued efforts in implementing the federal action plan for coal leasing and energy activities in the San Juan Basin.

The new draft has minimum allowable comment period of 45 day. It should be extended to a 90 day period in view of the fact that BLM has scheduled only one public hearing in Farmington. We view this as a deliberate attempt to minimize comments by keeping Navajos out and away from the public hearing. Further, the proposed single hearing would be inconvenient to Navajos in terms of distances required to travel to Farmington and use of a work day for the hearing. The Navajo people are the most affected single community by this plan. They strongly believe that this type of action by BLM is a pre-calculated attempt to circumvent Navajo participation. The Navajo Nation suggests that there be at least three public hearings on the reservation, on the weekend and in the Eastern Navajo Agency. The Navajo Nation clearly understand the deceptive act of BLM to make the document legally defensible without hearing Navajo concerns.

The Navajo Nation is still not convinced as to the need for new competitive coal leasing. We believe that Department of Energy production figure which BLM has based its assumptions are unrealistic.

The Navajo Nation still believe that the PRLAs should be denied. The Navajo Nation does not understand how inclusion of a true "no action" alternative improves PRLA's and several sub-alternatives with respect to issuance of PRLAs. It appears these strategies were devised to ignore Navajo concerns. The BLM does not promise or does it provide measures to protect resources which affect Navajos, their economy, culture, tradition and lifestyle.

Letter: Mr. Bill Luscher, State Director, BLM
Page Two

The new DEIS does not provide a meaningful answer to the question of relocating Navajos. The BLM should have addressed this in the new DEIS.

Since San Juan Basin is a water deficient area, it is strange that the BLM has failed to address the water availability problem. The Navajo Nation does not believe that BLM's recommendation to transfer this responsibility over State Engineer Office is a realistic approach to determine water availability.

Finally, BLM has failed in developing and incorporating its own plan in the DEIS whereby mined areas would be reclaimed. As a Federal Land Manager, BLM appears to ignore its required regulatory role while promoting its role as entrepreneur.

We desire a cooperative relationship with BLM. However, we do want BLM to know that if tribal lands are directly or indirectly affected, Navajo input should be encouraged.

Sincerely yours,

Alfred Dehiya
Alfred Dehiya, Director
Navajo Land Development

ATTACHMENT:

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The Navajo Nation hereby expresses its concerns with the inadequacies of second draft report on San Juan River Regional Coal Environmental Impact Statement prepared by the Bureau of Land Management (BLM) on October, 1983.

The views expressed in this report also reflect the concerns of the Navajo people by conducting public meeting, chapter resolution. Hearings arranged by the BLM and through the news media.

1. Legal Issues: There are several legal issues as listed below which must be resolved prior to final decision about coal development in San Juan Basin is made.

a. Mining, power generation and reclamation will require about 52,000 acre foot of water per year. This figure, however, does not include unknown requirement of water for a possible new town, and other facilities. In order to protect and defend water rights of the Navajo Nation, the following problems must be resolved.

2. What percentage or level of appropriation has occurred in San Juan Basin up to date? Is the basin over appropriated?

(ii) How will future Tribal appropriations be affected if

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the basin is brought to or near full appropriation due to regional coal and other development?

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(iii) What are Tribal water rights in the basin? Have they been adjudicated?

b. Navajo people have declared that they are qualified surface owners in the area where the proposed activities will take place. This right of surface owner has also been clearly defined in 43 CFR 3400.0-5 pp 1-3. This includes trust land, fee land, PL 2198 land and land where the Navajo have state or federal grazing leases. This is there ancestral home where Navajos have been living for nearly four centuries. BLM has to recognize this claim.

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c. The Navajo Nation has selected 3500 acres of public land of the Paragon Ranch for relocation. The selection requires both the surface and mineral rights under Section II of the Navajo-Hopi Relocation Act of 1980 (PL 96-305). BLM intends to withdraw that public land, in exchange of private land in Ute Mountain area for the construction of proposed New Mexico Generating Station there. The Navajo Nation believes that BLM action is not statutory as the tribal selection has precedence. Furthermore, there may be an apparent conflict between Public Land Order 2198, Executive Order 709 and 1000.

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d. The BLM, in its proposal, fails to recognize the Uniform Relocation Assistance Act, American Indian Religious Freedom Act and the Fifth Amendment to the U.S. Constitution.

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e. The legal validity of issuance of certain PRLAs is still unresolved. Executive Order 709 and 1000 are involved in lawsuit. The Navajo Nation recently filed in the district court of New Mexico. The Navajo Nation claims title to 2.1 million acres of land in northwest New Mexico. In that case, the current proposals PRLAs, competitive coal tracts and NMGS would have to be dropped completely.

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f. Legal justification for the need of the proposed power plant may pose another issue.

g. Finally, there may be some legal problems associated with BLM's land exchange plan.

4. Socioeconomic Issues:

a. Relocation plan for the Navajo families affected by PRLAs and or competitive coal lease is not clearly stated. It is unclear at this point as to where and how these residents will be relocated, the kind of compensation they are entitled to and

-3-

whether there will be enough grazing lands for the relocatees to maintain Navajo lifestyle and livelihood. The Navajo Nation strongly believe that they will never be adequately compensated or be provided with dwelling of equal value. It is believed that there will be a large impact on livestock grazing and availability of certain native plants and herbs they use for medicine or cultural purposes. There lifestyle will be impaired due to mining activities, pollution, noise, sickness and influx of non Navajo workers in and around the community. The proposed relocation of grave and/or sacred sites is not acceptable to the Navajo Nation.

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b. The Navajo Nation believes that most of the job created will be taken by the non Navajos as the BLM does not emphasize on preferential hiring and training provisions for Navajo to qualify for the newly created jobs. Navajos and BLM are in common agreement of the belief that outsiders will be the only ones to benefit from the mining and energy activities.

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c. Influx of outsiders will disproportionately increase the population resulting in shortage of housing, increase in crime, diseases, and alcoholism. The law and order will deteriorate and affect the Navajo lifestyle.

3. Reclamation, Revegetation and Land Use:

-4-

These items have not been addressed adequately and remain almost the same as in the previous EIS. The second draft EIS does not estimate loss of grazing land due to proposed activities; definite plan to restore and reclaim the land, treatment for toxic material, maintenance of soil productivity after reclamation, top soil preservation,--soil conservation and irrigation needs are also not discussed. In the arid climate it is often a gamble with nature to bring back the original vegetation. Examples of Navajo and McKinley Mines as successful reclamation sites is not logical to assure that the same can be achieved in the San Juan Basin because of different climatic condition and soil type.

Based on the past experience, the Navajo Nation does not believe in living the reclamation plan entirely on private companies. In case of underground mining, adequate measures to prevent surface subsidence must be specified.

4. Water Availability and Use:

It is highly inconceivable that 52,000 acre foot of water not including the water need for possible new town per year is available for the proposed power plant and mining activities. After meeting local domestic, irrigation and livestock demand,

BLM's assumptions and modeling technique regarding the ground water yield and also water quality from aquifers may not be realistic. It has not been explicitly explained that natural water will be available for residents during and after mining in sufficient quantity. Water Quality will also be impaired due to mining and power generating activities. It is surprising that BLM documents do not contain a rational water management, water replacement and treatment plan. It does not provide any solution to level up the pumping cost of water due to fall in water level caused by excessive water withdrawal.

A good percentage of water now under the Navajo tribal lands will be lost for future usage due to a substantial reduction in potentiometric head caused by pumping of water needed for mining. Aquifer permeability will be permanently diminished due to aquifer compression caused by reduction in water pressure. Even though future recharge may cause a water level potentiometric surface rise aquifer productivity could be greatly impaired.

The estimate formation recharge rate in the basin is not known. The minimum recharge rate for the arid climate has to be determined.

What is the projected aquifer water level potentiometric surface recovery time after the depletion of mining is not known.

5. Cultural, Paleontological and Archaeological Resources:

The Navajo Nation strongly believes that a complete cultural inventories must be taken before any decision is taken to implement the plan. It is the tribal understanding that once the

proposed plan is materialized, collection of data and its analysis would be salvaged due to lack of fund. It is believed that approximately 250,000 cultural and archaeological sites spanning 10,000 years of occupation are present in this basin which include the famous Chacoan Phenomenon. It is assumed that some 70 scattered communities remains of what is known to be of the most advanced pre historic cultures in the United States belong to this basin. There is a growing fear that due to influx of non Navajo will damage these artifacts. According to traditional Navajo belief, artifacts from the past should be left undisturbed. Maintenance and preservation of Chaco Roads and

Chaco Culture is another concern. The fossil deposit of this basin cover the evolution of land animals through the critical period' covering extinction of dinosaurs and the first widespread propagation of mammals. The fossils resources have recieved worldwide attention while the three wilderness areas present in this basin contain certain geological features noted for mushroom shaped rock formations, pinnacles and spires that create a "moon shape" appearance. The basin contains herbs of various varieties

which are used by Navajo medicinemen for medical and religious purposes under the preference right lease issuance, four PRLA's (NM 3834, 3838,6801 and 11916 overlap the designated VRM class II land of Bisti and Den-ah-zin wilderness areas are expected to be mined by underground methods subsidence caused by mining could disturb the topography, natural scenic features and visual quality on these PRLA's, which are mainly composed of fragile badlands. The land is also used for collecting, hiking, photography and other recreational purposes by tourists and local Navajos. Details of salvage, recovery and preservation plan, relocation of sacred and gravesites, mitigation plan, restoration plan, etc., have neither been worked out nor defined. The energy company would have least concern or regard for these resources and Navajo values.

6. Air Quality:

The magnitude of impact from dust, smog, sulphur dioxide, nitrogen oxides, carbon dioxide, carbon monoxide and other potential pollutants from power plant, exploration, mining haulage and reclamation activities, automobiles and heavy equipment, etc., on the people vegetation and wildlife is not fully known due to several unknown factors. These impacts have to be thoroughly analyzed. The final cumulative overview does not address regional haze due to proposed power plant. The

second draft Environment Impact Statement does not consider impact due to other mining activities already present, proposed and existing railroads, oil and gas fields, and other power plants and projects in the basin. Specific mitigative measures

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for various types of air pollution are not fully discussed in the documents. The major issues which are of prime concern to the

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Navajos have been very superficially treated. The Navajo Tribe therefore oppose any decision based upon superficial treatment of major issues.

7. Noise, Blasting, Damages and Transportation Problems:

The study, which is not complete and adequate reveals that there will be some impacts on the people, livestock and wildlife, but the impact is not quantified and measures to resolve have not been discussed. Vibration caused by blasting may also cause

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damage to the archeological artifacts, fossils and other fragile resources. Significant overloading of NM 371 between Farmington and the NMGS site is anticipated. Mitigative measures are not discussed or inadequate and unclear. The lease stipulations have not been satisfactorily developed to either eliminate or minimize these problems. There is no economic way at this time to

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transport the coal out of the San Juan Basin livestock including sheep, goats and cattle have traditionally grazed in the vicinity of unfenced rural roadways. Movement of heavy traffic will

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result in loss and/or injury of livestock. The proposed action does not provide adequate measures to overcome this problem.

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8. Fish and Wildlife, Threatened and Endangered Species:

All the land under proposed plan must be surveyed thoroughly to determine the presence of and impacts on various endangered species. The information provided does not adequately describe the baseline information. Navajo Game and Fish does have limited information on several threatened and endangered species that could be impacted by implementation of proposed action. This information was not considered in the draft EIS or other documents. The assumption that fish and wildlife can in their life time adapt to new surroundings and environment (fence, mining, noise, acid rain, excavation, pollution, etc.) without much problem is not convincing. Mitigative measures should be

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discussed in the documents. In depth biological investigation should be conducted to determine the extent of all wildlife in the proposed impact area. Quantifiable information will then be available to determine impacts and to recommend appropriate mitigation measures.

9. Non-Coal Resources:

The draft EIS does not address how the non-coal resources

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will be handled and what to do with these resources. Plans should be explained in the documents about the use and conservation of these resources if encountered during the mining activities.

10. Visual Resources:

In order to implement the proposed plan more urbanization would occur in existing communities; improved or extended access roads and various right-of-way will cause degradation of scenic quality of the landscape and destruction of some unique geological formations and wilderness areas. The document, however, does not address these issues as to how and when mitigations will take place.

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11. Actual Need for Coal and Power:

Due to unfavorable economic condition the demand and price of coal is lower. Several leading coal companies of the United States have put hold on their expansion plan, even some mines have stopped or reduced coal production. Competition is very strong with the declining coal demand, the resource in the Powder River will be adequate for the next 100 years. The projection for future demand of power by PNM is also not realistic and the Navajo tribe believes that it is over stated.

-11-

Under this circumstances, it is difficult to justify the need of the development activities at this time. The recovery of coal with present technology will be only 50% in a region like San Juan where it would be necessary to preserve and protect plentiful of cultural, archaeological and fossil resources and where the coal beds are thin and uneven. Success of reclamation is also an experimental matter under this soft market situation. Coal leasing will not bring a fair value without developing the coal and power market, haste in development of mining and energy activities will be an economical disaster until the economic picture of the country changes. What the Navajo Nation fears is that the coal companies will simply shift their operations to the San Juan Basin, where the coal quality is better, without any increase in total coal production for the region and without any significant improvement in overall economy and employment of the region. On the otherhand, the Navajos will bear all the adverse impacts and would benefit very little, if any.

Suggestions and Recommendations

a. "Delay Action" should be considered as a viable alternative to the BLM proposals. This will allow sufficient time for the legal issues to be resolved; impact studies, surveys, inventory, etc., to be fairly completed (as the present study was a hurried job); adequate mitigation plans, relocation plan and stipulations

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to be developed; and the economy of the nation to be improved and stabilized.

b. Certain coal tracts, where environmental impact is tremendous and the relocation problem is serious, should be dropped from lease sale.

c. Scope of the "unsuitability criteria" should be expanded to account for the unique Navajo needs, beliefs, lifestyle and culture. So far, the bald eagle has ironically been paid more attention in comparison to the local Navajo residents.

d. Communication with the Navajo Nation, its chapter houses and the local impacted residents has to be improved. This will facilitate solution of the complex land status and relocation problems in addition to enabling BLM and the energy companies to understand the Navajo needs and concerns and to get their full cooperation in the development activities. A programmatic Memorandum of Agreement between BLM, BIA, Navajo Tribe, State of New Mexico and National Park Service should be established to resolve and settle various common issues.

e. All the environmental impact mitigation plans should be completely and rationally developed and stipulations outlined before the final showing by energy companies.

f. Replacement of grazing resources should be addressed in detail and provided for, including the reclamation and revegetation of surface mined land within a specified time frame. This should be ensured by performance bond or insurance. In case of underground mining, the companies should procure subsidence protection insurance.

g. Water management, water use and water replacement plans must be developed prior to leasing or permitting and approved by the Navajo Nation in addition to New Mexico State Engineer's Office.

h. A program must be outlined before leasing to survey the locations and count, protect, preserve, salvage and restore all the fragile cultural resource in tribal museum, to provide buffer zones around sites and assure other relevant mitigative measures. It is neither practical nor economical to keep these works pending until mining activities are started and then rely on the coal companies. State and/or tribal permit will be necessary for the disposition of graves and sacred sites. All the requirements of State Historic Preservation Office and the Navajo Tribal Government should be compiled with in the conservation of the multiple resources of the basin.

i. Various stipulation on lease terms should be developed with

the inputs from various federal agencies, tribal government, state government and the general public. Flood Plain Management Executive Order (EO. 11988) should be complied with. Lease stipulations should also include compliance provisions with various state, federal and tribal environmental, health, safety and mining regulations.

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j. Additional alternatives to proposed actions such as an alternative which consider Bisti and Ah-shi-ah-pah WSAs as partial wilderness areas or Bisti and De-na-zin combined as one WSA should also be considered. Similarly, certain other

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alternatives of the San Juan River Regional Coal Leasing which can possibly be developed by combining one or more of the alternatives discussed, need discussion and treatment. In the

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matter of water use by coal and power companies and the possible new town, the feasibility of use of uranium mine dewatering discharge and use of techniques which consume less water should be determined. Cost/benefit ratios of the various alternatives need also to be adequately determined. Cost/benefit ratio need not necessarily be a monetary figure; important qualitative consideration is sufficient.

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k. Separate GIS documents should be prepared for the possible new town and water use since these are some major issues.

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Navajo Participation and Demands

Navajos always encouraged energy activities in their land and welcomed the energy companies. Often times these companies have neglected the Navajo concerns and did not share the economic and other benefits of the project activities with the local Navajo residents. As a result Navajos have suffered and lost.

Therefore, it is now their demand that due and just attention should be given to their concerns and needs. The Navajos, on the other hand, will extend their cooperation and helping hand and effectively and meaningfully participate in the development activities.

Their demands, briefly, are as follows:

a. They should be recognized as qualified surface owners in the checkerboard area where they had been living for centuries. The Navajo Tribal Council and Chapters should be given the opportunity to participate in various decision making and resource management processes or activities and communication should be enhanced.

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b. Local Navajo skills should be developed through proper advance training and schooling, if necessary, and fully utilized in the various activities and preference should be given to

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Navajo workers and Navajo-owned companies or contractors.

Notices of job vacancies and training should be given timely to the tribal government and chapter houses. The companies should seek and certify nonavailability of Navajo workers and contractors before giving jobs or the contracts to others. A specified and agreed upon percentage of the available jobs (skilled, unskilled and supervisory) and contracts should be reserved for the Navajo people.

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c. Cooperative agreements should be established between the Navajo Tribe and the energy companies so that the tribe can participate in the business activities by supplying labor, contractual and engineering services, and materials. The Navajo Tribe should be given the opportunity to participate in the decision making process to facilitate relocation, develop mitigative measures, etc. Opportunity for joint venture in business and financial participation should also be provided to the Navajos. BLM should also give preference to qualified Navajo

Coal Companies in the leasing process and for this purpose should also set aside certain tracts of coal selected by the Navajos to promote Navajo private or public sector. Navajo companies should be preferred as they are sensitive to the culture and thus will ensure maximum protection of the various cultural and archaeological resources and the Navajo lifestyle.

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d. The mining and power companies, in consideration of the tremendous impacts the Navajos will have to bear in their ancestral land due to development activities, should spend a specified and agreed upon portion of the gross revenue for social and community needs of the local Navajo people and the chapter. It is a worldwide customary practice for companies to render such concessions to the local people impacted by their business activities. Such facilities and services consist of replacement housing for the relocatees of suitable size with water, electricity, gas, garage, telephone, heating and access roads; public school and training school; public roads, church, cultural and recreation center; water wells, pumps, roads, cultural and recreation center; water wells, pumps, windmills or municipality water lines; sewage; medical facilities including free medical care at company clinics or hospitals; bus or other transportation system; discount in railroad freight; water treatment plant; banking facilities; chapter house with full facilities, museum, library; fire station; drinking troughs and corrals for relocated livestock, stock ponds, dams and livestock reservoirs; fences; scholarships; ceremonial places; senior citizen center; shopping centers with service station, laundromat, convenience store and other stores; ambulance facility; waste disposal areas; bread adobe ovens; sweat houses; sheep dipping vats; various compensations based on contract agreement in connection with relocation, grazing and property damages due to mining activity

and so forth. In fact, extent of these services could be decided jointly by the companies and the tribe and included in terms and conditions for relocation, along with time frames to provide these services. These needs will be analyzed on a case by case basis.

e. The legal issues as mentioned before should be rationally resolved prior to mining.

f. Relocation should be avoided as far as practical. When needed the company should give advance notice to the residents and work out the plan for relocation in consultation with the tribal government and the chapter officials. Prior selection of suitable land for relocation should be made which will provide adequate grazing facility and where Navajo lifestyle can prevail. Relocation should be done in accordance with the tribal relocation and resettlement policies and should provide the following stipulations: residents and grazing areas shall be relocated within the current chapter, close by, but out of the way of mining and other activities; relocation shall be staggered; families shall be relocated as a unit; the new location shall have sufficient water and forage, housing, social services health care and educational facilities; assurance should be given to reclaim the original land, keep the livestock permits and preserve the sacred sites; fair and adequate compensation for

dwellings and improvements shall be provided; overcrowding will not be allowed; food ration will be provided during the initial years; means shall be provided to minimize the psychophysiological, economic and sociocultural stresses of the relocatees during the transitional period by providing the human needs, eliminating conflicts between relocatees, hosts and other outsiders, providing an atmosphere where they can maintain their Navajo identities; and taking care of other needs as mentioned in item (d).

g. Law enforcement in the Eastern Navajo Agency is already difficult because of the checkerboard nature of tribal, federal and state jurisdiction. With the influx of outsiders this situation will become worse. Therefore the companies should be responsible for the conduct of the employees, their friends, relatives and visitors, contractors, and other outsiders. All Navajo tribal laws and ordinances shall be observed. Conduct compliance rules shall be developed in recognition of social and cultural traditions of the Navajos and approved by the tribe and enforced. Certain things, in particular will not be allowed within the Indian country, e.g., i.e., carrying or possessing fire arms (except by the police); possession and consumption of intoxicating liquors, drugs and marijuana; provoking fights with Navajos and others; disrespectful attitude toward Navajo people, livestock, culture and tradition; unwanted fence cutting and

negligent leaving of open gates, creating livestock loss or injury; unnecessary damage to vegetation, cattleguard, soil, timber, road, bridges, housing, etc.; hunting and fishing without permits; keeping wild pets or animals liable to kill or injure livestock; reckless or negligent use of vehicles creating risk of injury to persons or property, etc.

h. The companies as a token of friendship should help the Navajo people in the events of emergency and hardship; help in building dams, livestock yards, roads construction and maintenance; supply free coal; quickly settle claims for property damage, livestock loss, accident injuries, etc., due to mining and construction activities.

i. Applicable Navajo controls and standards will be established and enforced on the development activities as such standards are developed; these include but are not limited to water codes, safety codes, environmental codes, resource management codes, housing standards, air quality standards, relocation policies, compensation standard and procedure, mining and reclamation regulations, various environmental impact mitigation measures and procedures like sacred sites, grave sites, and archaeological sites preservation and relocation or salvage procedures, etc. Until such codes or standards are developed compliance with state or federal laws or regulation will be necessary.

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j. The lease stipulations should be developed on a tract by tract basis with the consent of the Navajo Tribe. Before developing the stipulations, the impact study, where inadequate, should be updated, modified, corrected and additional studies made if necessary. Particular attention should also be given to subsidence control, reclamation, land use and maximization of resource recovery. The Navajo Tribe is willing to participate in the various decision making processes and formulation of stipulations.

k. A central committee should be formed, comprising of members from the BIA, BLM, Navajo Tribal Government, the company representatives, chapter officials and councilmen, whose primary function will be to regulate the energy activities, ensure that all the stipulations and provisions of lease and development activities are complied with, hardships or relocation are mitigated, land use planning is timely completed, communication is improved; and the local residents are informed ahead of time what is going to happen and when, and what the impacts are.

l. In case of discovery of other minerals, the tribe will be informed immediately. All environmental pollution control plans, where applicable, should be approved by the tribal government which includes but is not limited to air and water pollution,

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land and soil damage, acid mine discharge, coal and spoil fire, subsidence, blasting and noise effects, waste disposal, toxic runoff, etc. Some tracts of good coal should be conserved for future use by the tribe. A study should be made to protect,

preserve and relocate the special interest plants and herbs which are used traditionally by the Navajos.

57.62

m. All the laws and regulations set forth in PL 03-531, the Navajo-Hopi Settlement Act, shall be applicable upon the transfer of land as authorized in PL 96-305, Section II.

57.63

n. All injuries, accidents and deaths to residents and livestock, as well as, property damages caused by mining, construction and energy activities should be immediately reported to the tribe and the chapter officials.

57.64

o. All the negotiated terms and conditions, stipulations, agreements, financial and other compensations, royalty and land rental agreements should be legally documented. These agreements or stipulations should be periodically reviewed, updated or modified to make them meaningful, effective and binding.

57.65

p. As regards to the actual counting of residents in the impacted area, locating and counting of all sacred and grave sites and archaeological sites the Navajo Tribe is willing to

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help the BLM and the companies. In fact, the tribe had developed a questionnaire to determine the impact of the mining and energy projects and a detailed mitigative plans. The tribe thinks that actual field survey is needed. To follow the system of predictive model and sampling for the discovery of sites as devised by OSM will be misleading and could lead to wholesale and disastrous destruction of a great many highly significant and valuable sites. If properly planned with the help of the Navajo Tribe, mitigation of the archaeological, cultural and fossil resources will be easier and it will enhance exploration, preservation, recovery and knowledge of these resources.

q. Finally, the companies, the tribal and chapter officials, BLM, BIA and other concerned state and federal agencies should jointly discuss and finalize the various common issues before and during the development activities.

Conclusion

The Navajo Nation is not satisfied with the environmental impact statements presented by BLM because they seriously underestimate the impacts of the proposed individual projects as well as the cumulative effect. It is hoped that the BLM and the coal and power companies give just and serious consideration to the Navajo concerns and the issues are dealt with diligently and rationally,

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Responses to comment letter #57.

- not cursorily. There is the need to extend the deadline of the offer for the lease sales until the various details are completely worked out, agreement is reached in various aspects with the Navajo Tribe, various uncertainties are removed and public gets enough time to give their input. In conclusion, it is important that most meaningful and intelligent decisions be made, with careful consideration of public input, so that optimal utilization of resources can take place in proper harmony with environment.
- 57.1 See the responses to comments 1.2 and 31.12.
 - 57.2 See the response to comment 1.2.
 - 57.3 See the response to comment 11.4.
 - 57.4 See the response to comment 11.4.
 - 57.5 Impacts on water levels in major aquifers in the San Juan Basin were estimated by using a digital model developed by the U.S. Geological Survey. The regional analysis is generalized by providing ranges of drawdowns for specific aquifers. The real distributions of drawdowns are displayed in plates 1 and 2. Although affected wells are not mentioned specifically, impacts to existing wells may be determined by plotting the location of the wells on the drawdown maps for the appropriate aquifer and comparing existing and projected water levels. Also see the response to comment 11.4.
 - 57.6 See the response to comment 57.5.
 - 57.7 Ground water quality is discussed on page 2-27 and Table 2-8 of the Second Draft San Juan River Coal EIS. Quality of ground water in the San Juan Basin is classified as ranging from fresh to moderately saline.
 - 57.8 Reliability of the USFS Digital Model and other information is available in a U.S. Geological Survey open-file report. This report, along with the assumptions and input data (aquifer stresses) and model calibration are available for inspection in the Albuquerque District of the ELM and the USGS Water Resources Division.
 - 57.9 See the response to comment 11.4.
 - 57.10 Impacts to alluvial aquifers are mentioned on page 3-15 of the Second Draft San Juan River Regional Coal EIS. Your concern over alluvial aquifers is recognized.
 - 57.11 Cumulative impacts are addressed in a separate document "Final San Juan Basin Cumulative Overview and Comment Letters," ELM New Mexico State Office, Santa Fe, NM, September 1983. Copies of this document were provided to the Navajo Tribe in an earlier mailing.

- 57.12 The text on page 3-86a has been revised.
- 57.13 Since the proposed leases are not within the current recognized boundary of the Navajo Reservation, Tribal regulations have not been listed as a regulatory source. This would not, prevent the Navajo Tribe from later asserting whatever jurisdiction over these leases.
- 57.14 It is stated in the Chapter 3 Assumptions that all mining would be done in accordance with all statutory and regulatory minimums. Design of diversions and other water control facilities are specified and will be in compliance with Surface Mining Control and Reclamation Act (SMCRA) and the State Surface Coal Mining Regulations (CSMC, Rule 80-1).
- 57.15 See the response to comment 57.13.
- 57.16 The need for more stringent design criteria will be assessed during the mine plan stage by regulatory agencies.
- 57.17 The information concerning the number of wells is available. The effects of mining on these wells, however, is unknown until the areas that will be disturbed by mining is known. The site-specific impacts resulting from specific actions presented in mine plans will be analyzed in more detail in environmental documents prepared by the Office of Surface Mining, Reclamation and Enforcement when such mine plans are developed. Such mine plans have not yet been developed.
- 57.18 Significant impacts are analyzed in this EIS with considerable knowledge of the hydrologic system, especially pertaining to ground water. Impacts are also summarized from the Final Environmental Assessment for Coal Preference Right Leasing, New Mexico (EIM 1981). Sediment yield data were obtained from a draft Sediment Yield Control Plan for McKinley and San Juan Counties, New Mexico Natural Resources Department and U.S.D.A. Soil Conservation Service, Santa Fe, New Mexico, January 1979.
- 57.19 Please refer to response 57.17 concerning impact analysis on water supplies to local Navajo Chapters and communities and water needs for the duration of mining and reclamation. Please refer to the response to comment 57.2 concerning water rights litigation. Please refer to the response to comment 52.14 concerning water needs and uses and the assurance of availability.
- 57.20 The number of allottees and the number and type of livestock is available for review at the Farmington Resource Area Office. Environmental documents to be prepared at a later date on actual mine plans will be much more specific and detailed concerning families involved, livestock numbers and type, and grazing use areas.
- 57.21 Table 3-4 of the Second DEIS shows the AUMs that would be removed. The maximum number of AUMs estimated to be lost from leasing would be 2,041 for PRAs, plus 9,977 for high level or 12,018 AUMs which divided by 12 months converts to 1,002 animal units (AU). One AU equals five head of sheep; therefore (1,002 x 5 =) 5,010 head of sheep. Assuming 3 percent of these sheep were rams there would be 4,860 ewes; and if each ewe raised a lamb, there would be 4,860 lambs for sale in one year. If a 90 pound sale weight is used and the October 1983 mid-month price of \$.47 per pound is used, then each lamb is worth \$42.30. The 4,860 lambs would be worth \$205,916. Wool is another saleable product. If 10 pounds of fleece is assumed from each sheep (5,010) then 50,100 pounds of wool at the October 1983 mid-month price of \$.71 per pound would be worth \$35,571 or a total for lambs and wool of \$241,487. The projected 1,987 loss through leasing would be 548 AUMs which is worth approximately \$11,108 or 4.6 percent of the total. In the year 2000 a loss of 2,049 AUMs is estimated which is worth approximately \$41,053 or 17 percent of the total. Horses have not been valued, but each horse would replace at least 5 sheep. It is doubtful that the total loss would even occur in a single year. These losses are not all Indian losses.
- 57.22 Various mitigation measures are listed in the appropriate sections of the DEIS regarding protecting resource impacts which affect Navajos. In addition, measures pertaining directly to American Indian Concerns are listed on pages 3-89 through 3-92, and special stipulations are listed in Appendix I-2 of the DEIS. Navajo culture, tradition and lifestyles have been taken into consideration throughout the document.
- 57.23 The BLM has never had the legal responsibility for water allocation. The New Mexico State Engineer has the legal responsibility for water allocation. Refer to the revised text on page 2-20.
- 57.24 The surface water is fully appropriated or committed for appropriation. Ground water is available for appropriation and is handled on a case-by-case basis by the State Engineer's Office. Effects of ground water appropriation on the surface water must be offset by retirement of existing surface rights.
- 57.25 The BLM believes that neither the Navajo Nation as surface owner of trust or fee lands nor individual Navajos as grazing leases of public lands can be a qualified surface owner as that term is defined in 43 CFR 3400.5 (gg). The BLM does not have the authority to extend the definition of "Qualified Surface Owner" beyond what was established in SMCRA. A case-by-case determination will be made for each individual or family, occupying lands within a tract, as to whether or not they meet the requirements [(3400.0-5)(gg)].

57.26 The Uniform Relocation Assistance Act has been considered and determined not to be applicable to the relocation discussed in this DEIS. However, the alternative mitigating measure listed on pages 3-91 and 3-92 proposes reimbursement based on the Standards of the Uniform Relocation Assistance Act (see discussion on 3-92). The American Indian Religious Freedom Act has also been considered and does not, to our knowledge, afford protection to certain sacred sites. However, we have proposed mitigation measures for these sites (see pages 1-19 and 4-135 of the Second DEIS). We believe the BLM has followed the due process clause of the fifth amendment.

57.27 See the response to comment 14.1.

57.28 The method of relocation of graves and/or sacred sites is proposed to be handled similarly to previous relocations that have taken place in similar surface disturbance areas on and/or near the Navajo Reservation. However, necessary relocations will be coordinated with the Navajo Tribe, BIA, Medicine Men Association and other appropriate individuals as necessary. Mining within 100 feet of a gravesite is considered unsuitable unless it is lawfully relocated (see page 1-18).

57.29 Refer to the response to comment 9.4.

57.30 The EIS does contain estimates of the loss of grazing on page 3-16. There is a detailed discussion of reclamation issues in the reclamation section pages 3-9 through 3-12. On the De-na-zin mine very little supplemental irrigation has been used. Milching and water harvesting has proved to be fairly successful and in some cases more successful than supplemental irrigation. A more detailed analysis and reclamation plan would be required at the mine plan stage. There were two mines which were recently permitted near the proposed tracts. There were challenges to determine whether revegetation would be technologically and economically feasible. OSM approved the Burnham mine which is located on the Navajo reservation. This approval was challenged in court but was upheld. The State of New Mexico approved the Gateway mine after a challenge to the feasibility of reclamation.

57.31 The allocation of water for all uses is determined by the New Mexico State Engineer and the water adjudication process.

57.32 Both the aquifers and the location in the San Juan Basin need to be specified in order to consider recharge rates. The Steady-State recharge rates for specific model layers at specific locations (constant-head nodes) for the model that was used in the computer simulations are presented in the report by Frenzel and Lyford (1982). As shown in the

57.32 (cont) report, the minimum recharge rate was zero. During the simulations, these rates changed depending on the location and the amount of stress (ground water withdrawals) applied to the model.

57.33 According to the computer simulations, the potentiometric surface of each major aquifer will not recover to pre-stress levels until after 2040. As mentioned in the text (page 3-30) and as shown on Plate 1, the maps for 2040 show a recovery in the potentiometric surface in the middle of the cone of depression. Presumably this recovery will continue after 2040, which was the last year simulated.

57.34 See the response to comment 11.18.

57.35 See the response to comment 5.3.

57.36 There is a discussion of cumulative interactive air quality impacts on pages 3-1 through 3-7 of the cumulative overview. The air quality impacts of coal mining are discussed in Chapter 3 of this document. The air quality impacts of the New Mexico Generating Station are discussed in Chapter 3 of the New Mexico Generating Station EIS. The BLM believes the air quality impacts have been adequately addressed.

57.37 See the response to comment 8.1.

57.38 The mitigation measures discussed in the EIS are general. Specific measures would be stated for the individual leases at the time the lease is issued.

57.39 Noise impacts to people, livestock and wildlife cannot be meaningfully quantified; or thoroughly analyzed in this document. When a site-specific mine plan is submitted for approval and an environmental analysis prepared the impacts of noise will be analyzed and specific mitigating measures will be developed.

57.40 See the response to comment 41.3.

57.41 Refer to the Alternative Mitigating Measures section on transportation, pages 3-89.

- 57.42 Provision for threatened and endangered (T/E) species surveys is provided for on page 1-19. All information which has been made available to date to the ELM has been used during development of this EIS.
- 57.43 Mitigative measures are provided for on pages 1-19 and 3-87 of the Second Draft San Juan River Regional Coal EIS.
- 57.44 Wildlife studies were conducted on those locations and species when it was determined they were needed.
- 57.44 Non-coal resources will continue to be managed by the ELM through the applicable laws, regulations and policies. Non-coal resources which exist within the mining area will be considered in the site-specific Environmental Analysis prepared for the mine plan.
- 57.45 Mitigation should be applied when the plan of action for the improved or extended access is initiated. In the case of the mining operation, mitigation regarding scenic quality could be applied after analysis at the mine plan stage. The actual stipulations to mitigate adverse conditions from mining or related activities will be attached to the mining permit.
- 57.46 The Secretary of Interior has the option of delaying or staggering the competitive coal lease sale. Because the delay of any action is a procedural consideration and not an alternate level of leasing, this is not included as an alternative.
- 57.47 The Secretary of the Interior has the discretion not to lease tracts that have serious social and environmental conflicts.
- 57.48 The unsuitability criteria are defined in 43 CFR 3461. Additions or modifications to the existing criteria would require a change in the regulations. The analysis in this EIS is based on existing regulations.
- 57.49 Stipulations will be provided to the applicant in the request for final showing.
- 57.50 Compensation for livestock facilities would have to be negotiated between the livestock operator and the lessee. Grazing on public land is a privilege held by the permit holder; therefore, there would not be any reimbursement rights on any portion of a permit suspended because of mining activities and operations. More detailed information on the reclamation and revegetation time frames will be analyzed in mine plans. A bond that covers reclamation is required for areas within a mine permit area by OSM.
- 57.51 Water use and replacement plans are developed prior to approval to mine.
- 57.52 The ELM is committed to the protection of cultural resources as discussed on page 1-16. The sites and appropriate buffer zones that require in-situ protection under the unsuitability criteria are discussed on pages 1-21 through 1-23.
- 57.53 The stipulations attached to the coal leases will be determined by ELM and BIA. The ELM and BIA will consult with Federal, State and Tribal agencies in the development of these stipulations. Input on stipulations from the general public that was made on the first and second Drafts will also be considered. The Regional Coal Team may recommend the stipulations to be attached to the leases. Stipulations requiring compliance with existing laws and regulations are considered part of the proposed action and are listed under General Stipulations, page 1-15.
- 57.54 The analysis of additional alternatives to the proposed actions for the three WSAs such as considering Bisti and Ah-shi-sle-pah as partial wilderness areas or Bisti and De-na-zin combined as one WSA is beyond the scope of this EIS. This was covered in the Draft Proposed Wilderness Areas Environmental Impact Statement (November 1982) for Bisti, De-na-zin and Ah-shi-sle-pah WSAs as part of the San Juan Basin Action Plan.
- 57.55 Combinations of tracts selected for analysis in these alternatives are considered to be most reasonable. The Secretary of Interior has the authority to choose intermediate levels.
- 57.56 The use of water from uranium mine dewatering in reclamation is not contemplated at this time. Several organizations are experimenting with water harvesting methods in reclamation.
- 57.57 The cost/benefit analysis is not applied in the EIS analysis in the usual method. However, jobs and other economic benefits for community growth are considered on the benefit side while adverse impacts are considered as costs. Some benefits and costs are quantifiable and have been considered. Qualitative benefits and costs have also been considered and discussed but are much more difficult to assess objectively.
- 57.58 See the response to comment 57.25.
- 57.59 These "demands" have been adopted as alternative mitigating measures (see page 3-90). The ELM and BIA in consultation with the Navajo Tribe, State and Federal agencies will recommend to the Regional Coal Team, the ELM State Director, and the Secretary of Interior the stipulations that will be applied.

57.59 Training and preference to Navajos has been proposed in the mitigation measure listed on page 3-89. This will be considered as a stipulation for the coal leases. Also see responses to comments 59.9 and 59.10.

57.60 See the response to comment 57.29.

57.61 See the response to comment 11.5.

57.62 As stated in response 15.20 on page 4-138 of the Second Draft, a stipulation has been recommended to include plants of special interest or cultural significance in reclamation seed mixtures in traditional gathering areas (See, page 3-89 and 3-90). Also see response to comment 59.7.

57.63 All Federal and State laws determined to be applicable will be adhered to upon transfer of land under the Navajo-Hopi Settlement Act.

57.64 This "demand" was adopted as an alternative mitigation on page 3-90 DEIS. Coal mining on public lands is subject to all the mining safety and other laws and regulations protecting life and property during associated activities administered by the various Federal, State, and local agencies. In general, only those accidents affecting mine production are required to be reported to the BLM. Other agencies with reporting authority are the New Mexico Bureau of Mine Inspection, Federal Mine Safety and Health Administration, Office of Surface Mining and the New Mexico Energy and Minerals Division. It may be possible for a memorandum of understanding to be developed between the BIA and other agencies which extends accident reporting authority.

57.65 See the response to comment 57.59.



TONEY ANAYA
GOVERNOR

58

STATE OF NEW MEXICO

OFFICE OF THE GOVERNOR
SANTA FE
87503

November 23, 1983

RN 1010

Mr. Charles W. Luscher, Director
U. S. Bureau of Land Management
Department of the Interior
New Mexico State Office
P. O. Box 1449
Santa Fe, New Mexico 87501

Dear Mr. Luscher:

As Governor, Attorney General, and Commissioner of Public Lands for the State of New Mexico, we wish to express our appreciation to the Bureau of Land Management for their efforts which have gone into the preparation of the Second Draft San Juan River Region Coal Leasing Environmental Impact Statement. We realize that the preparation of this document was not an easy task, and we wish to recognize all the State BLM personnel who contributed to its preparation.

We are disappointed that the BLM did not see fit to schedule more than one hearing for comments concerning the Second Draft. As was stated in our earlier letter, we feel that this issue is extremely important to the citizens of this state and that they should have been given more than one opportunity to comment on the Second Draft. We therefore suggest that the BLM leave the record open in order that public comments heard about the Second Draft at the December 13 Regional Coal Team meeting may be addressed in the Final Environmental Impact Statement.

It is noteworthy, however, that the BLM has incorporated in this Second Draft many of the suggestions which the State has made in the past relative to federal coal leasing. In particular, we feel that the current analysis of the impacts from the issuance of the Preference Right Lease Application (PRLAs) is more appropriate, as well as the identification of the various subalternatives to issuance. We are also pleased to see the discussion of the PRLA leasing stipulations. We believe that the PRLA leasing stipulations which are suggested in the Second Draft will be quite useful in alleviating the concerns of many of the local residents living in the areas of PRLA development, and we support them wholeheartedly. We are well aware of the ongoing effort to determine the Fair Market Value of the PRLAs, and look forward to a satisfactory conclusion of the joint effort of the BLM and the State in that Project.

Also of note is the fact that the Interior Department has seen fit to reduce the San Juan River coal leasing target from the previous 1.3 billion ton level to the new level of 800 to 900 million tons (in-place coal reserves). However, in light of the continuing softness of the nation's coal market, and in view of the various complications with land ownership and transportation which still plague potential coal developers in the San

Mr. Luscher
November 23, 1983
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Juan Basin, we wish to reiterate the suggestion made in our letter of April 8, 1983, concerning competitive coal leasing in New Mexico. That is, the first phase of any competitive coal leasing should be limited to "bypass tracts" and only those tracts of a demonstrable competitive nature which will provide true fair market value. We would further suggest at this time that the BLM consider postponing the competitive lease sale until several months after the issuance of any preference right leases. Providing a reasonable lapse of the time between the two federal actions would give potential bidders a chance to assess the value of the competitive leases in light of potential mining developments of PRLAs. Further delay of the sale would also allow the BLM time to include the newly acquired coal in the Lee Ranch area as part of a sale offering. It is our opinion that, at this time, the federal lease tracts which would be created as a result of the Santa Fe Pacific Railroad Company land exchange would be some of the most desirable tracts in the entire Basin. They do not have development complications attached to them that currently exist with prospective competitive lease tracts farther north in the Basin, and it appears they will be more accessible to rail transportation facilities.

We would also recommend that the BLM adopt a leasing strategy which offers the competitive lease tracts in stages. The first stage should consist of tracts which appear to be the most competitive, in light of the present coal market conditions, as well as any bypass tracts. The results of the first stage as well as current market conditions would form the basis for the second stage of the lease sale. The second stage would then take place a year or more after the first stage. The second stage would allow time for potential competitors to assess each other's position, and would take advantage of the expected improvement in market conditions for coal.

Staged leasing would also help to encourage more gradual and orderly development of the federal coal leased in the San Juan Basin which, in turn, would tend to lessen the impacts from coal development. If additional coal mines begin production over a longer period of time, then the State would find it easier to deal with impacts upon the transportation system, regulatory functions would be better administered, and the overall air quality impacts will be spread over greater time. In addition, socio-economic mitigation would be more manageable, since the total impacts would be spread over a longer period of time.

We encourage the New Mexico BLM to utilize the wealth of recent information acquired by the State in deciding upon a staged leasing timetable. The State also has expertise in this area, and we are certainly willing to work together with your staff in determining such a schedule. The State recently completed a project popularly labeled the "Coal Market Study" which is, in our opinion, the most definitive document available concerning the demand for New Mexico coal and the timing for that demand. We believe that the Coal Market Study more accurately forecasts future market conditions than the forecasts which have been used by the BLM in arriving at their current leasing targets. We strongly urge the BLM to use this readily available information in its planning.

The State continues to be concerned about the impacts that both the competitive and the Preference Right Leases will have upon the Native Americans living in the affected areas. Although the proposed mitigation measures outlined in the DEIS appear to be adequate, there may still be a problem

Mr. Luscher
November 23, 1983
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with communications between the BLM and Native Americans, and lessors and Native Americans.

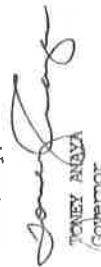
To further ensure that lack of understanding by Native Americans does not preclude the consummation of equitable resolutions of surface owner problems, we would suggest that the BLM institute a policy whereby all contracts that are signed between Native Americans and others involved in coal leasing be reviewed by an impartial third party. The third party could be picked jointly by the BLM, the BIA, and the Navajo Nation. This arrangement would ensure that Native Americans living on affected lands would be fully aware of the consequences of contract commitments, and afford protection to coal lessees against subsequent claims arising from misunderstandings.

Besides the issues discussed above, there are several specific technical issues which are not properly handled within the DEIS. These issues have been addressed by several different State agencies and the individual comments of the State agencies involved in the review of the DEIS are attached. In reviewing the attached comments, please feel free to contact the individual State agencies for any detailed discussions you may wish to have concerning their comments. In addition, these agencies are available to assist in any way possible to ensure that all issues are adequately handled in the Final Environmental Impact Statement.

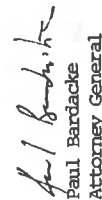
We would like to take this opportunity to thank you and your staff for all the diligent work which has gone into this Second Draft Environmental Impact Statement. We also urge you to give serious consideration to our comments. We believe that if the State and the BLM work cooperatively on coal leasing, then we will be able to utilize New Mexico's vast coal resources in a manner in which the benefits will far outweigh the costs.

As you know, however, your work on the DEIS and our comments could be subject to change depending upon the contents of the Linowes Commission's final report and Congressional scrutiny of the entire program once the Commission's report is submitted. We urge you to leave sufficient flexibility in the record to ensure that this potentially vital information will be incorporated.

Sincerely,


JIM BACA
Governor


Jim Baca
State Land Commissioner


Paul Bardacke
Attorney General

TA:SC



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GOVERNOR

JILL Z. COOPER
CULTURAL AFFAIRS OFFICER

THOMAS W. MERLAN
DIRECTOR

November 9, 1983

Paul Biderman, Secretary
Energy and Minerals Department
525 Camino de los Marquez
Santa Fe, New Mexico 87503

Dear Mr. Biderman:

Thank you for the opportunity to comment on the October 1983 San Juan River Regional Coal Environmental Impact Statement as part of the State EIS Review Task Force. This letter is a joint response prepared by the State Archaeologist and the State Historic Preservation Officer under the responsibilities defined by the State Cultural Properties Act.

We feel that this draft statement is a marked improvement over the November 1982 draft and the BLM has been responsive to many of the deficiencies identified in our previous reviews. It is clear that even with the reduced acreage presently proposed for leasing, coal development will inevitably result in adverse impacts to a large number of archaeological sites within the San Juan Basin. Nonetheless, we are impressed with the quality and character of the revisions in the DEIS. We very much appreciate the continuing cooperation between the State and Federal governments in developing ways to minimize potential losses to the cultural resources in the San Juan Basin and the responsiveness of the BLM to the comments made regarding the earlier draft.

A primary concern with the previous DEIS was that BLM had not completed adequate archaeological inventory for the purposes of leasing pursuant to the existing coal programmatic memorandum of agreement for the management of cultural resources on Federal coal lands. Since that time, BLM has conducted additional sample inventory to bring archaeological coverage up to at least 10% of all tracts presently recommended for leasing (Appendix A-11). We feel that this supplementary inventory provides for a more reasonable assessment of potential impacts to archaeological resources within specific coal tracts, and should give competitive bidders a better idea of what potential survey and mitigation costs may be incurred in lease development. It should also be sufficient to identify the majority of "archaeological fatal flaws" within particular lease tracts.

Our previous reviews noted the absence of explicit statements concerning the identification and treatment of cultural resources at the mine development stage. On October 1, 1982 the Cultural Properties Review Committee passed

the following resolution:

It is the Committee's policy that on-the-ground inventories must be conducted in all areas where coal mining and related land-disturbing activity is proposed, and that decisions about treatment of identified cultural properties be made on the basis of the inventory.

We are pleased to observe in the DEIS that, consistent with the policy of the State Cultural Properties Review Committee,

lessees will be required to carry out intensive field inventories of cultural resources on uninventoried portions of the areas that may be affected by lease-related activities and develop mitigation plans that include as appropriate provisions for data recovery, curation, detailed recordation, stabilization, and relocation to provide appropriate levels of protection from adverse effects for specific properties (A63-64).

This appropriate outline of procedures for dealing with cultural resources is reiterated throughout the text of the DEIS in such statements as,

a complete inventory is a standard operating procedure and will be conducted before mining permits are issued (p. 4-91-2).

Equally important is the statement on page 4-92:

It is also acknowledged that mitigation plans will be developed as needed from the completed inventories.

In general these requirements are adequately conveyed in Stipulation 31(a) of the Standard Lease Form included as Appendix I-1. However, we recommend that Stipulation 31(a) be expanded to require preliminary site-specific treatment recommendations as part of all archaeological inventory reports for lease areas. These recommendations by the field archaeologists regarding research potential and treatment are essential for subsequent evaluations of site significance and effect by Federal and State review agencies pursuant to the National Historic Preservation Act of 1966 as amended and the State coal permit review process pursuant to Rule 80-1.

We would also like to point out the importance of establishing high standards for survey documentation, excavation, data analysis and report preparation to maximize the amount of information retrieved from individual sites. The decisions about treatment should be made in the context of well-designed research plans which are based on the specific inventory results and regional archaeological patterns. The latter patterns should be identified in the context of the state plan (36 CFR 61 and 18-6-7A NMSA 1978). The research plan should utilize the most adequate and satisfactory research strategies that have been developed by the archaeological profession to guarantee that relevant and meaningful research is accomplished with the identified resources. The plan must also address the issue of in-situ preservation of those occasional outstanding cultural properties which are of such outstanding significance that all concerned agree they should not be excavated (e.g. Pierre' Rutin).

We would like to underscore the need for proper curation of excavated materials including artifacts, field notes, maps, photographs and so forth so that the retrieved materials are easily accessible to future researchers. We believe that proper curation of site materials can help alleviate the "major problem" identified in the DEIS on page xii,

if the information gained through excavation, extraction, and study of these resources will be of greater value than the losses incurred.

Archaeological materials are intended to be restudied many times over again; in this regard they are analogous to primary historical documents which are kept in our public records centers to be read by many researchers with many different research interests into the indefinite future. Proper curation can definitely help ease the problem identified in the DEIS.

We would be pleased to work with the involved Federal agencies to establish appropriate standards to insure maximum coordination between Federal and State review processes concerning cultural resources in mine development areas.

If we can provide additional information concerning any of the above, please do not hesitate to call.

Sincerely,

Thomas W. Merlan
State Historic Preservation Officer
Historic Preservation Division

TWM:CFS:NEW:jmg


Curtis F. Schaafsma
State Archaeologist
Museum of New Mexico

COMMENTS OF THE ATTORNEY GENERAL
OF THE STATE OF NEW MEXICO

ON
THE SECOND DRAFT OF THE SAN JUAN
RIVER REGIONAL COAL ENVIRONMENTAL IMPACT STATEMENT

The comments made by the Attorney General and numerous other parties, concerning the need to define coal markets in order to assure that the Federal and state governments receive fair market value for the properties and in order to assure orderly land use planning and infrastructure development, have been totally neglected by the Department of the Interior (D.O.I.). D.O.I. has merely scaled down its previous leasing plans but still has not tied its plan, to lease approximately 900 million tons of coal, to any real analysis of coal markets.

The market for San Juan coal leases will define when production may be expected to start and the value of that production. The value of that production in turn will define the royalties that will flow both to the United States and to the state of New Mexico. Although the EIS recognizes that "preference right lease applications" entail half to two-thirds of the regions' unleased surface-mined coal, and despite the well-known soft leasing market (in light of the Powder River coal leasing sale), D.O.I.'s only analysis of coal markets is to assume that (a) all leases will be let and in production within ten years of the issuance of the lease and (b) that Federal coal covered by the "PRIA's will be combined into logical mining units with state and

private coal. (See Second Draft EIS, p. 3-2). Such assumptions are not supported by any facts and such analysis of coal markets is not adequate.

Although future coal royalties, bonus rates and environmental impacts will obviously be affected by the number of tons of coal mined, the Second Draft EIS at p. 3-3 estimates recovery by universally applying general coal recovery tonnage rates (50 percent for underground mines and 85 percent for surface mines). Yet D.O.I. admits that actual recovery is "difficult to assess" exactly "because of numerous variables that affect recovery rates." Obviously, the amount of effort to mine the coal and the consequent recovery tonnages will be determined in part by the value of the coal, and the converse is also true. The value of coal proposed to be leased and coal recovery levels are thus interrelated.

The Second Draft EIS contains the assumption that the Star Lake Railroad, including spurs and loops, would be available to transport the coal by 1987. (See Id. p. 3-2). Also assumed is that the Fruitland Coal Load Transmission Line would be available. Neither assumption is supported by any facts.

The relationship between economics and environmental quality maintenance is neglected in the discussions of reclamation and air pollution control. The discussion of reclamation generally engages in speculation about the reclamation potential of the

lands proposed to be leased; the variations in costs per ton associated with alternative reclamation scenarios go unaddressed. It cannot be assumed that complete reclamation will occur absent reference to the economic costs of that reclamation. To plan for any level of reclamation without considering its costs would appear to be fallacious. Similarly, with regard to air pollution control, the Second Draft EIS makes some rather general assumptions about emissions and their effects on air quality without considering alternative levels of emissions that might be affected through alternative levels of pollution control. This simply is not planning from a conservation standpoint.

58.4

The Second Draft EIS continues to address the air quality aspects of the mining proposals in a superficial manner. It discusses only total suspended particulate matter and fails to contain any inquiry regarding the chemistry of the particulate or the chemistry of the emissions that will result when the coal proposed to be leased is burned. That chemistry, particularly the ash chemistry, varies from coal to coal.

58.5

It is reasonable to assume that the chemicals found in regional aquifers, listed at Table 2-8 of the Second Draft EIS, will also be found in the particulate given off during mining and perhaps in the coal ash. Those chemicals include sodium, potassium, chlorine, and fluorine. Their release into the air

58.6

should be of concern to those charged with protecting the environment.

58.6

The Second Draft directs its discussion of total suspended particulate matter to the question of whether emissions of such particulate matter might cause ambient air quality standards to be exceeded. This discussion is not directed to the additional load on the ambient air that mining the proposed leases might create irrespective of whether that loading would violate a standard. Thus, the discussion does not take a conservation approach to air quality resources and neglects the possible preemptive effect on other development that such coal mining might have.

58.7

While the discussion mentions the prevention of significant deterioration (PSD) requirements of the U.S. EPA, it does not note that those PSD standards neglect fugitive dust, except to the extent that such dust is reflected in data on background air quality.

58.8

The Second Draft contains no clear validation of the particulate emission factors being used in the EIS. Indeed

58.9

Appendix G, entitled "Air Quality", of the Second Draft contains a lengthy disclaimer concerning both the emission factors employed and the dispersion model then used. That disclaimer, found at p. G-4, states:

It must be understood, however, that the modeling studies were limited by various constraints, and the conclusions are

consequently subject to limitations which should be borne in mind by the reader....

Accuracy of modeling results obtained in this study is affected by a number of potential sources of error, including inaccuracies in modeling inputs and in the dispersion model itself. Particulate emission rates were generated by using mine design parameters estimated by the BLM, which may not be the actual values used by the mine developers. Emissions were also calculated based primarily on empirical emission factors developed for surface coal mines located in other western states (Wyoming, Colorado, and Montana); hence, their applicability to coal mines in the San Juan coal region is assumed but has not been validated.

Accuracy of modeling results is also affected by the inherent limitations of the CDMQC model. The CDMQC model has not been thoroughly validated for air quality assessment of coal mine development. However, it is generally accepted that its predictions of annual average concentrations are accurate within a factor of two. Its predictions of 24-hour impacts may be less accurate, since they are based on a statistical relationship developed for urban areas. The statistical procedure also assumes that the model pollutant has a lognormal distribution for all averaging times.... The CDMQC model was originally developed for use in an urban area and was not modified for use in a rural scenario. (Emphasis supplied)

The Interior Department relies on the CDMQC model to predict ambient air quality in an area of over 47,000 square kilometers (an area more than twice the size of New Jersey). A brief perusal of that modeling effort shows that it cannot be reasonably relied on. The model used meteorological data regarding wind speed and

direction and atmospheric stability that were obtained by averaging results of three monitoring stations (located at Farmington, Gallup, and Grants). The model predicts annual average pollutant concentrations based on a steady-state Gaussian dispersion formulation. The model itself was designed for assessment of gaseous pollutants but was modified to simulate particulate fallout due to gravitational settling and also to calculate annual geometric mean concentrations. In its application, the model made estimates on a grid of points five kilometers apart. It can readily be seen that the modeler's reliance on such a gross grid, on the assumptions that annual average numbers are the numbers that are relevant and that the atmosphere is dispersed in a steady state even manner, yields results that can have no connection with local realities. The failure to use air dispersion models and emission factors verified for local conditions increases the likelihood that the consequent results of the model are inaccurate by a factor substantially greater than two.

Taking the model results as given, it can be readily seen that the emission levels predicted, when multiplied by two to reflect the accuracy of the model and its designed uses, give us a substantial number of "exceedances" of air quality standards.

The Second Draft EIS, at p. 1-39, states that total suspended particulate standards for 24 hours proposed by the state of New

Mexico would be exceeded without the use of "best available control technology" in all but the no-action alternative.

The comments in the Cumulative Overview verified that the San Juan Coal EIS only focused on total suspended particulates. (See Cumulative Overview, p. CO-27.)

The Cumulative Overview's response to questions about noise levels, found at p. CO-41, is merely that "because many residents would be relocated as a result of coal mining, and because regulations prohibit mining within 300 feet of a residence without specific permission, noise and due stress are not expected to reach significant levels". This is a trivialization of what could be a very serious problem.

Similarly, in response to a request that impacts be

reanalyzed using a more realistic time frame for development, the Department responded that the Secretary has the discretion to lease or not to lease any tract and, therefore, could alter the time frame for coal leasing. (See p. CO-41.) It then asserted that "it is believed that the present analysis is adequate".

Obviously, this response begs the question of the relevance of the data to the real world problems facing the Department of the Interior.

In our initial comments, we noted the difficulties encountered in assessing coal reserves in the San Juan Basin. In the Second Draft EIS, the Interior Department states at xiv that

it is considering the issuance of leases for 26 PRLA's with an estimated 1.4 billion tons of Federal coal. It is there further stated that issuance of leases for those PRLA's would bring into the marketplace approximately 2.2 billion tons of in-place coal reserves. Additionally, the Department is recommending, as its preferred course of action, release of eleven tracts containing .916 billion tons in place or .349 billion tons of recoverable Federal coal. (See p. VI of the Second Draft EIS.) The accuracy of the reserve estimates associated with these numbers is nowhere specified in the Second Draft EIS. Thus, both the accuracy of the estimate of the amount of coal proposed to be leased and the potential market for the aggregate amount of coal are simply not addressed.

58.10

Previous objections that specific tract delineations relied on non public data and were inadequate to allow effective analysis by the public remain.

The ability of the affected agencies to monitor and to control the development or non-development of these leases and to collect adequate royalties remains, as noted in our original comments, unaddressed.

In light of the above, the AG must conclude that the Department of the Interior has failed to respond to material criticisms leveled against the initial San Juan Draft EIS. Further public hearings and comments are required and the results

thereof must be addressed by D.O.I. in the NEPA process. Such actions are required by the significance of the issue and by the need to have the open and reasoned decision-making required by law.

Respectfully submitted,

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Attorney General

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STATE OF NEW MEXICO



TRANSPORTATION DEPARTMENT

P.O. BOX 1028
SANTA FE, NEW MEXICO 87503

November 1, 1983

TO: Paul Biderman, Chairman
San Juan River E.I.S. Review Task Force

FROM: Fred Friedman, State Transportation Department

SUBJECT: N.M. Transportation Department Concerns on San Juan River Regional
Coal Environmental Impact Statement

The Transportation Department has coordinated review of the above-named document with appropriate divisions in the Department itself, as well as in conjunction with the task forces State Highway Department's representative.

1. From a highway utilization standpoint, the Transportation Department's Motor Transportation Division has communicated concern regarding oversized and overweight truck usage on highways discussed in the E.I.S. The Division will continue to enforce size and weight standards within the coal development region.

2. The Transportation Department is presently chairing a task force on general transportation within the state's N.W. quadrant. Subjects to be addressed by the group include the safe and economical transportation of coal and other commodities originating and terminating in San Juan and McKinley Counties.

3. The E.I.S.'s a description of rail activities as they relate to the transport of coal in the region are brief, with no references to the potentially significant Navajo Railroad. A number of rail and highway coal-transport scenarios have been developed and a description of them, with appropriate maps, would strengthen B.L.M.'s second draft environmental impact statement.

58.11

Included in such descriptions would be:

1. Proposed Star Lake Railway (both are a private line and are a common carrier);
2. Navajo Railroad;
3. "371 Alternative" (Rail-highway combination for multi-commodity use).

FSF:mmc



STATE OF NEW MEXICO
HIGHWAY DEPARTMENT

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GOVERNOR

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OPPORTUNITY
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TONY ANAYA
GOVERNOR

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT

525 Camino de los Marquez
Santa Fe, New Mexico
87501

November 2, 1983

TO: BRUCE STOCKTON
ENERGY CONSULTANT

FROM: LARRY L. BYRD
RECLAMATION SPECIALIST

SUBJECT: COMMENTS ON SAN JUAN COAL REGIONAL ENVIRONMENTAL IMPACT STUDY

The Second Draft of the San Juan River Regional Coal Environmental Impact Statement incorporates the written comments submitted by the State Highway Department and identifies, though somewhat summarily, the significant traffic impacts upon State Roads 44, 57, and 371. These three roadways will require future improvements to safely absorb future traffic levels especially with respect to heavy tractor-trailer trucks. The single proposed transportation mitigation measure of requiring the coal lessee to construct right-of-way fences will be helpful in preventing livestock-associated accidents, if instituted.

The linchpin of the coal leasing and development options is the timely construction and operation of the Star Lake Railroad. In lieu of the uncertainty of the Star Lake Railroad being available to transport coal by 1987 and the infeasibility of transporting coal long distances by truck, further coal leasing activities in the San Juan Region may be premature at this time.

Sincerely,

Sterling Mathias

Sterling Mathias
Environmentalist

SM:ec/WPC

I. Transportation Corridor

Careful planning should be given to multiple use transportation corridors. This will allow for industrial development along with conservation of land. Aesthetic values are also considered in the multiple use corridors since the transportation lines, pipelines, transmission wires, highways, and railroads will be planned to be conglomeration in one central corridor. This will mean that basically only one land mass will be impacted.

Vegetation

The development of mining will impact the grazing land use. However, in some cases the lease plots will be developed on vegetation plots which are overgrazed. Sagebrush is one of the dominate vegetative types in the San Juan Basin, and it is likely, that with proper reclamation techniques, the post mining land use will be enhanced. The figures concerning the loss of RUM's are difficult to comprehend.

The reclamation on the mine permit areas will be regulated by the Mining and Minerals Division, and the latest research and development projects will be incorporated into the overall efforts to insure that the impacted land will be reclaimed adequately.

Hydrology

The overall hydrologic impacts will be addressed in the mine plan application. Many of the mines are zero discharge, and this will not significantly affect the overall ecosystem.

The impact on ground water will be evaluated on a site specific basis and proper mitigative measures will be recommended. The loss of ground water will have to be monitored very carefully to avoid any long term impact.

Fish and Wildlife

The overall impacts appear to be nonsignificant, however, site specific studies will be required for each specific permit application. Proper mitigation measures will be implemented accordingly.

Comments on "San Juan River Regional Coal Environmental
Impact Statement"

October 1983

by Donald L. Wolberg and Frank E. Kottowski
New Mexico Bureau of Mines and Mineral Resources
Socorro, New Mexico 87801

Introduction

This report considers aspects of the second draft of the San Juan River Regional Coal Environmental Impact Statement (DEIS), October, 1983, issued by the U. S. Bureau of Land Management. The comments included in this report constitute our second round of review. Although corrections have been made in the second DEIS, a good deal of ambiguity still remains. A likely solution or means of avoiding the inherent difficulties in this document, from New Mexico's perspective, was touched on in our earlier comments and is repeated here:

"We note the lack of substantive input by the State of New Mexico and its agencies in determining the content, direction and conclusions of the BLM documents... We suggest that New Mexico would have been better served if responsibility for various aspects of these documents had been delegated to the State with BLM serving as coordinator. It is our view that actions directly impacting the State should be addressed by the State and its agencies."

We suggest that these earlier observations are still valid. We suggest that the public is not well served by these documents and the process that leads to their formulation. We suggest that monies and efforts expended for document preparation would have been better utilized by the State in the formulation of its own documentation. In our view, in order to better function as manager of public lands, BLM should serve as coordinator and moderator rather than active participant in decision-making processes that do not affect BLM but do affect the citizens of New Mexico. New Mexico is quite able to manage its own affairs and can do so more efficiently if an external entity such as BLM

restricted its role. Perhaps, new congressional legislation is needed to place the role of federal agencies in a more rational context.

The comments below follow the organization of the second draft of the San Juan River EIS; page numbers and/or section headings are given for our comments. This method of commentary presentation was suggested as appropriate by Secretary Biderman and Mr. Stockton.

Comments

General Conclusions

The first two paragraphs of this section (p.xi) are unclear in terms of meaning. For example, the second sentence of the

first paragraph reads: "Most impacts, which can be attributed to new Federal leasing, gain their significance by adding to an existing taxed situation." The use of "significance" and "taxed" seems ambiguous; is the meaning of this sentence "stressful" or "financial/economic?" Similarly, the second sentence of the second paragraph (p. xi) is unclear as to meaning: "The

magnitude of these impacts tend to be diminished when measured across the entire San Juan River Region, but are compounded when measured locally." It is difficult for us to fathom the intent of this sentence. The third paragraph of this section (p. xi)

states that any extractive activity, "...would further commit the region to an economic base of energy minerals, i.e. coal, oil and gas, and uranium. Therefore, the stability of the region's economy will, more than ever, revolve around the cycles of the nation's energy minerals industry." We would ask whether any

other economic base that offers the possibility for anything beyond subsistence is rationally possible for the region. Similarly, it is probable that no significant expansion of the oil and gas component will occur and in fact this component will certainly decrease in significance no matter what happens to other components with time. Given the state of the uranium industry worldwide, little if any expansion is likely in this component for some years. Thus, only expansion of development activities in an organized and coherent manner in the coal component is likely to be able to ameliorate a deteriorating regional economic picture for the San Juan Basin. We would also point out that the present cyclicity seen in the energy market place is, to a large extent, the product of a national dependence on foreign energy to make up the gap between domestic consumption and domestic use. Anything that allows us to increase production and diminish reliance on imports will firstly lessen the cyclicity and secondly reduce overall per-unit energy costs. Similarly, orderly energy development will truly reflect economic needs rather than be a reaction to potential external crises.

No Action Alternative

The first paragraph of this section (p. xii) states that under the No Action Alternative: "Present yearly production of approximately 17.9 million tons is expected to increase to 40 million tons by 1987." We are nearing the end of 1983. Given the time required to get mines into operation, given the lack of adequate coal transportation facilities, given the lack of new power plants, given the lack of newly developed external markets

58.14 (or the means to get coal to them if they do exist), we question the validity of projecting a 230% increase in coal production in the region in some three years.

The fourth paragraph (p. xii) of this section notes that topography would be altered on nearly 25,000 acres of land as a result of surface and subsurface mining. Firstly, how much "topography" would be altered for each mining technique.

Secondly, why would topography be altered by subsurface mines (considering mining rather than access roads, surface facilities, etc., related to subsurface mines). Thirdly, if surface mined areas are areas of gently rolling lands and are reclaimed to much the same aspect, how much is the topography really altered? Fourthly, this alteration will not be "instant" but extend over the life of each mine.

In this same paragraph, it is noted that, "One thousand one hundred fossil collection sites could be destroyed," and we wonder (1) whether these are "real" numbers and represent actual fossil sites or (2) whether any, some or all of these sites contain fossils that a paleontologist would collect anyway.

The seventh paragraph of this section (p. xiii) states that if coal is increasingly mined in the region, land use patterns will, "shift from agriculture toward mining and semi-urbanization." It is noted that the 25,000 acres will support

3,157 AUM's, or something less than 1 animal/acre. If a steer sells for about \$500, then \$1.5 million have been removed from the regional economy/year (if all 25,000 acres are impacted each year and if all 3,000 or so steers are born, raised and sold each year). If 40 million tons of coal are mined each year and sold

58.17 for \$20/ton, then \$800,000,000 is realized each year in the market place. One may ask whether a steer in the San Juan Basin needs 8 acres to subsist or 20 or 30 (we think that any steer eating only off of 8 acres would be a thin steer indeed). Similarly, we are hard pressed to categorize the extant land use pattern as "agricultural," at least in the usual meaning of that term. However, reclamation should restore any AUM's temporarily lost.

We are not sociologists but are disturbed by the obvious paternalism evident in the 11th, 12th and 15th paragraphs of this section (p. xiii). While it is agreed in these paragraphs that mining will bring economic benefits to the region, it is strongly implied that citizens will not be able to "cope" with enhanced incomes. Why should citizens of the region be more inclined to

58.18 become alcoholics, criminals, child abusers, drug abusers or neglect their spouses just because they have the opportunity for jobs, increased income, better schools, roads and hospitals. We do not deny that adjustments would have to be made but we see no reason why an orderly development program for the region would more greatly benefit the people of the region than harm them. We see no reason why the region's citizens could not adjust to these changes.

Preference Right Lease Issuance

The fourth paragraph of this section (p. xiv) states that 47,020 acres would suffer alteration from surface and subsurface mining. We wonder, again, how subsurface mining would alter topography. We also ask that the acreage number (47,020) be

58.19

- 58.19 adjusted to reflect amount of land disturbed per year. Similarly, this same paragraph states that, "Two thousand two hundred thirty seven fossil collection sites could be destroyed," and we ask what data indicate (1) what proportion of these would ever be collected by paleontologists anyway and (2) how is this number arrived at.
- 58.20 Paragraphs 13-15 (p. xv) and paragraph 17 (p. xvi) raise sociological-economic concerns in much the same manner as those discussed above in the No Action Alternative Section. Our same comments apply to these paragraphs as well.
- 58.21 Paragraph 16 (p. xv) states that most of the coal mined would be shipped by rail. Although we agree that rail seems the best means of shipping the region's coal, we wonder if this appears to be a reasonable assumption given present circumstances in the region; how likely is a rail line(s) to possible mining areas.
- 4-1168
- Subalternative II: Exchange or legislation-PRLA
- Paragraph 5 (p. xvii) states that "Forty thousand, four hundred thirty five acres of topography would be disturbed as a result of surface and subsurface mining." While we do not know what an acre of topography is, we are uncertain how subsurface mining affects surface expression of landforms. Paragraph 6 also states that, "...five hundred fifteen acres would be removed by facilities construction." How is it that BLM can state that 515 acres of 40,435 are needed for facilities construction but cannot determine how many acres are needed for facilities construction for each of the previous alternatives.
- 58.22
- Paragraph 5 also states that, "Two thousand one hundred seventy six fossil localities" could be destroyed. Do these 2,176 "fossil localities" differ from "fossil collection sites" (previous terminology) in kind or quality. Indeed does this number (2,176) represent actual, identified fossil occurrences or is the number an extrapolation of other data? In this section, it is noted that 4,935 AUMs would be temporarily lost. It is not clear whether this loss is a maximum, cumulative figure through time; if so, how many AUMs would be lost per year.
- 58.23
- This section (as do previous sections) notes that "camping and fishing" may diminish due to population increases in the area. We wonder whether this conclusion is reasonable. The extent of camping activities in the region appears minimal anyway and fishing even more so. We have encountered few fishermen in the Chaco, Bisti, Split Lip Flats, Huerfano area.
- One is struck by the obvious positive economic impacts identified in this section (p. xviii). In Farmington, no less than 5,194 more jobs (a 16% increase in employment) are projected and 1,731 more job (a 324% increase in employment) are projected for Cuba by the year 2000. The cascade effect of this increased, coal related employment in these areas, as earned monies are spent and circulate through the local economics must be considered positive. There is little likelihood that any other avenues for economic expansion at comparable levels would be available for these communities.
- 58.24
- 58.25
- 58.26

Bypass Alternative

This alternative (p. xviii) notes that 53,170 acres would be topographically altered by surface and subsurface mining. We suggest that surface and subsurface components be separated and ask why subsurface mining will alter topography. We note that

the sixth paragraph suggests that 53,150 acres of vegetation would be removed and 5,801 AUMs lost during mining. We ask whether these figures are cumulative and if so, they should be modified to reflect annual impacts to vegetation and AUMs.

Page xix notes that 199 cultural sites have been found. It is interesting that 1,148 to 1,680 cultural resource sites were predicted to occur. Some exploration of this discrepancy should be noted.

Paragraph 4 of this section (p. xviii) notes that,

"approximately 2,508 fossil localities would be disturbed or destroyed." It is unclear what, if any, distinction can be made between "fossil localities" and "fossil collection sites," a term used elsewhere in the summary. Similarly, it is unclear what proportion of these "fossil localities" would ever be collected or investigated by paleontologists or what proportion of the "approximately 2,508 localities represent actual documented occurrences.

Minimum Surface Owner Conflicts Alternative

This alternative represents the preferred option of the Regional Coal Team. The fourth paragraph of this section (p. xix) suggests that 66,327 acres would suffer, "alteration of topography," resulting from surface and subsurface mining. It is

unclear what portion reflects surface mining disturbance and what portion will be attributable to subsurface mining. It is unclear how subsurface mining will affect surface topography.

Paragraph 4 of this section states that: "approximately 2,373 fossil localities could be disturbed or destroyed." It is unclear how "fossil localities" differ from "fossil collection sites," a term used earlier. It is also unclear whether the number of localities represents actual, documented localities or projections of estimated numbers likely to be present. It is unclear whether any, some, or all of these localities would ever be collected by paleontologists.

Paragraph six of this section states that 66,327 acres of vegetation would be removed and 9,466 AUMs displaced. This obviously represents cumulative figures and this data would better be presented in annual increments. Similarly, the market value of the AUMs should be contrasted to the market value of the coal.

The seventh paragraph notes that 384 cultural resource sites have been documented and that 1,612 - 2,200 are expected to occur. It is unclear, how many of the documented sites represent significant occurrences.

Target Alternative

Paragraph five of this section (p. xx) notes that 82,997 acres would suffer topographical alteration as a result of surface and subsurface mining activities. We suggest that each type of mining and the area each is expected to impact should be separated out. Similarly, we suggest that impact data be

58.35 presented in an annual manner rather than cumulatively. It is unclear how subsurface mining will impact topography.

58.36 This same paragraph suggests that 3,637 fossil localities could be disturbed or destroyed. It is unclear how "fossil localities" are differentiated from "fossil collection sites," a previously used term. Similarly, it is unclear whether this number is an actual count or a projection. It is unclear whether these localities have sufficient merit to warrant collection by paleontologists.

58.37 High Alternative
The fourth paragraph of this section (p. xxi) states that topography would be altered on 115,661 acres by surface and subsurface mining. This is obviously a cumulative figure and it would be more helpful to break this down into annual numbers. It is unclear how subsurface mining will alter the topography. This same paragraph notes that, "approximately 3,930 fossil localities could be disturbed or destroyed." We are unclear as to the meaning of "fossil localities," as compared to "fossil collection sites," a term previously used. We are also uncertain whether the 3,930 number represents actual fossil occurrences or is a projection of estimated occurrences. Similarly, do these localities represent occurrences that are paleontologically significant?

58.38 Paragraph seven of this section notes that vegetation would be removed on 115,661 acres and 15,175 AUMs would be displaced. These figures obviously represent cumulative impacts and would be better presented in annual form. Similarly, the

58.39 "fossil collection sites," a term previously used. We are also uncertain whether the 3,930 number represents actual fossil occurrences or is a projection of estimated occurrences. Similarly, do these localities represent occurrences that are paleontologically significant?

58.40 Paragraph seven of this section notes that vegetation would be removed on 115,661 acres and 15,175 AUMs would be displaced. These figures obviously represent cumulative impacts and would be better presented in annual form. Similarly, the displacement of AUMs should be contrasted to the annual value of marketed coal.

58.41 Chapter 1: Description of the Alternatives
The fourth paragraph of page 1-8 states that, "approximately 22,020 total acres would be disturbed by this alternative (this number is repeated in Table 1-4, p. 1-11). Yet in the summary, page xiv, the number used for disturbed acreage is 47,020. Which is correct?

58.42 The Bypass Alternative is discussed on page 1-8 and following. On page 1-11, it is noted that, "the total amount of surface disturbed on these tracts would be approximately 6,130 acres. However, in the summary, on page xviii, it is stated that surface and subsurface mining will disturb 53,170 acres under the Bypass Alternative.

58.43 The section dealing with Minimum Surface Owner Conflicts Alternative (pages 1-11 and 1-12) states (p. 1-12) that, "the total amount of land disturbed on these tracts would be approximately 19,302 acres." However, the summary (p. xix)

58.42

states that 66,327 acres would be altered as a result of surface and subsurface mining.

58.43

The section discussing the Target Alternative option (pages 1-12 and 1-13) states that 35,977 acres would be disturbed. The summary (p. xi) states that 82,997 acres would be disturbed.

58.44

The section discussing the High Alternative (p. 1-13) states that 68,641 acres would be disturbed. The summary (p. xxi) states that 115,611 acres would be disturbed.

We cannot understand the lack of agreement in the presented data.

Committed Mitigation Measures

Paleontological resources are considered on pages 1-18.

This section simply is a restatement of Section 31(b)

Paleontological Resources of BLM's coal lease form. It offers little of use to paleontologists or industry in defining actual needs, significance of encountered fossil material, or appropriate mitigative responses. This section of the EIS (actually the BLM coal lease form, since this section only restates the lease form), is simply not adequate; it does not in fact address mitigation measures.

For example, it is stated that a paleontological survey may be required. No criteria for determining whether a paleontological survey is required or not required are offered. We can only assume that some BLM functionary with or without paleontological training will in some way arrive at such a determination.

58.45

It is stated that if a paleontological survey is required then the report of that survey "must contain recommendations for protecting the larger and more conspicuous fossils of scientific interest." It is unclear what criteria determine scientific interest, except the fact that the fossil may be, "larger and more conspicuous." This statement is ridiculous; scientific importance of paleontological materials has nothing necessarily to do with size or how conspicuous fossils are. A large, fragmented dinosaur femur may well be more conspicuous than a partial mammal jaw, only inches long, but the mammal jaw is certainly more important than the dinosaur femur.

58.46

Similarly, not all fossils significant or insignificant, represent vertebrate animals. Fossil material of scientific or educational importance may in fact be fossil invertebrates or plants. The BLM so-called mitigation measures do not take these categories into account (unless of course a very "conspicuous" or "larger" fossil clam or tree is found). The BLM measures lack clarity, definition or reasonable criteria for determining significance of fossil material or a mitigation program that makes sense before mining is initiated or while mining is ongoing.

58.47

The BLM and BIA lack any semblance of active internal paleontological programs and it is not likely that any other Federal agency (e.g., Paleontology and Stratigraphy Branch of the U. S. Geological Survey) which are busy meeting their own program obligations, can provide the assistance needed by BLM or BIA.

Therefore in order to meet the likely demands for qualified determinations, BLM and BIA will have to reply on other avenues of support.

This last fact is significant. The State of New Mexico has been aware that sedimentary rocks associated with coal resources may also contain significant fossil materials. In an effort to allow development of the coal resources of New Mexico and to make certain that paleontological materials would be adequately protected, the State initiated discussions that eventually led to the development of the document: Paleontological Mitigation Procedures for Surface Coal Mines on New Mexico Lands. These procedures were developed from discussions organized by the New Mexico Bureau of Mines and Mineral Resources in Farmington, New Mexico, in 1981 and in which representatives of the academic community, private industry, Federal and State agencies (including BLM) and the Navajo Nation participated.

These procedures, a copy of which was submitted with our previous comments on the first DEIS, provide a rational, coherent mitigation program for paleontological resources encountered before mining activities are initiated and for monitoring ongoing operations. We suggest that the New Mexico procedures are more rigorous and sensible than BLM's proposals and should be adopted with modifications to replace the ineffectual stipulations now contained in the BLM coal lease form.

The following program should be contained in the BLM coal lease form for application to federally administered lands in New Mexico. Such a program can be readily implemented and provides an opportunity for substantive contributions toward

adequately dealing with paleontological materials encountered in areas that will be mined. We offer these proposals as a solution for BLM's and the public's needs.

PALEONTOLOGICAL MITIGATION PROCEDURES
for
SURFACE COAL MINES ON FEDERALLY MANAGED LANDS
IN NEW MEXICO

1. General Provisions

1.0 Introduction

The State of New Mexico has economically significant coal resources on lands managed by the U. S. Bureau of Land Management. Sedimentary rocks associated with these resources may also contain fossil materials. In an effort to develop the coal resources of New Mexico and insure that paleontological materials will be adequately protected, agencies of the State of New Mexico and U. S. Federal Government enter into this agreement. The procedures outlined below will be incorporated into BLM Coal Lease forms.

1.1 Scope

These procedures will be applied and incorporated into mine plans for surface coal mines on Federally managed lands in New Mexico.

1.2 Responsibility

The lead agency for this plan is the U. S. Bureau of Land Management. The action agency for this plan is the New Mexico Mining and Minerals Division and its representative(s).

1.3 General Procedures

The procedures consist of three phases:

- I. Preliminary surface inventory, significance determinations and mitigation
- II. Mining mitigation plan
- III. Preparation, curation and repository functions.

2. Preliminary

2.0 Inventory

A. Determination of Need

As used here, paleontological inventory means the detailed and descriptive listing of fossil materials and the geologic contexts in which they occur within potential mining areas. The action agency will determine the need for a preliminary inventory. An inventory is a listing process and is treated separately from a determination of significance. Significance determination is

an evaluating process that utilizes special criteria; these criteria are listed in paragraph 2.1D.

B. Methodology

The inventory process will result in the location and description of paleontological materials and the geologic contexts in which they occur within a defined study area. Adequately recording the occurrence of fossil material depends upon the availability of adequate base maps and detailed data recording, strengthened when necessary by photographic documentation. Emphasis should be on reproducibility and relocatability of results. Inventory procedures should concentrate on areas of bedrock exposures in order to locate in situ materials. All potential fossil categories - vertebrate, invertebrate and paleobotanical - should be included in the inventory. Micropaleontological samples are easily obtainable from field samples or cores. A representative core or cores should be made available and permanently maintained together with a documented stratigraphic section of exposed rock units in the defined area.

C. Responsibility

The action agency and its designated research staff drawn from other New Mexico agencies or divisions will perform under this part unless the operator elects to have the inventory performed by other qualified agencies or paleontologists approved by BLM and MMD.

2.1 Preliminary Significance Determination

A. Responsibility

The action agency and its representatives is responsible for determining the significance of paleontological occurrences. The determination of significance will be treated as a separate but parallel process to the inventory.

B. Definition

As used here, significance means an estimation of the scientific or educational importance of paleontological materials.

C. Materials to be inventoried

The following types of material, if identified during inventory will be evaluated to determine significance according to the criteria in 2.1D:

1. Vertebrate material, such as:
 - a. Complete skull and/or jaw;
 - b. Articulated or complete skeleton;
 - c. Concentration of vertebrate material;
 - d. Unique or rare occurrence; and
 - e. Intimate association with the paleoenvironment.
2. Invertebrate material, such as:
 - a. Good to excellent preservation of shell material;
 - b. Concentrations of diverse material;
 - c. Unique or rare occurrence;
 - d. Intimate association with the paleoenvironment; and
 - e. Stratigraphic sequence.
3. Plant material, such as:
 - a. Well preserved plant material of any kind;
 - b. Petrified wood;
 - c. Fossil stumps; and
 - d. Intimate association of fossil plant and animal materials.

D. Criteria

Any of the following criteria may be used to indicate significant occurrences of fossil material in the inventory, or listing process and the functional analysis process.

1. Does the material contribute to faunal or floral lists;
2. Does the material significantly contribute to the systematics of the group or groups collected;
3. Does the material contribute to our knowledge of the functional anatomy of the organism;
4. Does the material contribute to our knowledge of the biostratigraphy, paleoecology or taphonomy of the occurring organisms; or

5. Does the material possibly contribute to a potential museum exhibit or other significant educational use.

2.2 Mitigation

A. Responsibility

Following the inventory program and significance determination, a surface mitigation plan will be developed by the action agency in consultation with BLM and the operator for any materials determined to be significant under the criteria in 2.1D. The State action agency is prepared to conduct any work that is needed using their own staffs and facilities subject to sufficient appropriations. If operators wish to select and implement their own program, they may do so at their own expense and own schedule. These efforts must be approved by BLM and MMD.

B. Methods

Depending upon the results of these initial phases, an adequate mitigation program might entail a recommendation for action of varying scale for the purposes of premining paleontological data recovery. Adequate mitigation may involve data recovery from a scientifically designed sampling program.

2.3 Costs

Costs of the premining inventory, significance determination and mitigation procedures will be equally shared by the action agency and the company involved, except as specified in Paragraph 2.2A.

2.4 Administration

Administrative and liaison functions will be shared by BLM and MMD.

2.5 Ownership of Fossil Resources

Ownership of fossil resources will remain with the United States. Access to documentation and collection will be made available to qualified individuals, institutions or agencies.

3. Mining Mitigation

3.0 Notification of Finds During Mining

Once mining is initiated, significant material may be uncovered. When such an event occurs, the mine operator will notify BLM and MMD. Together the BLM and MMD will formulate an appropriate response leading to an onsite inspection and initial determination of significance. Response to the request will be within 24 hours.

3.1 Evaluation

Upon arrival at the site, the representative of BLM and/or MMD will make an initial determination of significance and proper course of action. If the initial determination is that a significant occurrence has been discovered, a conference between the operator and BLM and/or MMD shall be held within 24 hours of such initial determination.

3.2 Continued Mining

Mining may continue before a representative of BLM and/or MMD arrives if the material can be set aside or if mining can proceed without interfering with the material.

3.3 Monitoring

A program of periodic monitoring of mine facilities will be carried out by the action agency or its representative(s). This program will be coordinated with mining schedules and fit into slots of "down-time", holidays, accessibility, etc., in order to have minimal impact on mining activities.

3.4 Cost

Costs related to actual paleontological mining mitigation and salvage will be met by BLM and MMD. Costs associated with loss of production and equipment down-time are not considered a cost of mitigation. The only contribution requested from industry relates to possible use of equipment and personnel, if needed, except as specified in 3.5 below.

3.5 Operator Programs

If operators wish to select and implement their own program, they may do so at their own expense and own schedule. These efforts must be approved by BLM and MMD after recommendation by the action agencies prior to implementation.

3.6 Ownership of Fossil Resources

Ownership of fossil resources will remain with the United States. Access to documentation and collection will be made available to qualified individuals, institutions or agencies.

4. Preparation, Curation and Repository Functions

4.0 The function and costs of preparation, curation and storage of materials will be met by the action agency or its representative, or other entity designated under paragraph 1.2 unless permission to prepare, curate, store or display has been granted to another agency or institution.

Major Issues

Paleontology is briefly treated in this section on page 1-27. Unfortunately, the understanding of public concerns is presented in a naive manner that really misses the point. The issue isn't whether mining will destroy some fossils or uncover other fossils. Rather, an adequate premining and mining mitigation program, such as that outlined above, will enhance fossil recovery and provide paleontological research and collection opportunities that would not be available any other way.

Comparison of the Impacts of the Alternatives and PRLA's Topography, Geology, Mineral Resources (p. 1-32)

It seems strange to note, as the DEIS does, that surface mining will disturb the surface and that more surface mining will disturb more surface area!

Paleontology (p. 1-32)

There is no reason why coal development should destroy important fossil localities if an adequate mitigation program is adopted by BLM. This section notes that the Bypass alternative

would disturb an estimated 570 important fossil localities.

However, the summary (p. xviii) states that 2,508 fossil

localities would be disturbed or destroyed. Similarly, page 1-32

states that, "the number of localities disturbed would nearly

triple under the Target Alternative. . . " (570 x 3 or 1,710

localities). However, the summary (p. xx) states that, "3,637

fossil localities would be disturbed or destroyed." Again, page

58.50

1-32 states that under the Minimum Surface Owner Conflicts Alternative, "... would affect only 136 fossil localities." However, page xix of the Summary states that 2,373 fossil localities could be disturbed or destroyed. We are at a loss to explain these wide disparities.

Turning to Table 1-7, Comparison of Impacts for PRLA Alternatives (pages 1-36 and 1-37) we are similarly confronted by still different numbers. For example, under the No Action option as noted in this table, 25,000 acres of land would be topographically altered and 1,100 fossil localities destroyed or disturbed. Under the PRLA Issuance option, 22,020 acres would be altered and 1,137 fossil localities disturbed or destroyed. However, the Summary (p. xiv) states that 2,237 "fossil collection sites" and 47,020 acres would be affected. The numbers become extremely confusing!

Table 1-8, pages 1-39 through 1-41 offer still other numbers. For example, the number of paleontological sites destroyed or disturbed in the Bypass Alternative in this table (p. 1-39) becomes 271 (not 570 as on p. 1-32, or 2,508 as is stated in the Summary, p. xviii). The number for the Target Alternative becomes 1,400 (not 3,637 as on p. xx of the Summary). Number changes similarly affect totals for acres affected and coal mined. Once again, we are perplexed by the differences in data.

Affected Environment

We will only offer limited comment on this section of the DEIS related to geology and paleontology. The data presented is

extremely generalized and abstracted from detailed studies that are readily available to the interested reader. We will ignore errors in Figure 2-3 (pages 2-15 and 2-16) and the documentation in this figure and figure 2-1 (p. 2-4) of rock units that have nothing to do with coal in the Cretaceous. We will not comment on generalities made in Map 2-1 of outcrop data of coal-bearing units.

We do wonder about the following quote seen on page 2-17:

"The new Museum of Natural History would be an excellent facility to curate the fossils of the San Juan Basin. They would also help in excavation of and in studying the fossils that were found."

Apart from the questionable use of language, this passage seriously and adversely impacts ongoing stratigraphic and paleontologic studies in the San Juan Basin by a host of institutions, well known to BLM. We wonder at the purpose of

this passage. Similarly, we question whether BLM wishes to interject itself as an arbiter of the question of who can or cannot conduct research in the San Juan Basin and we hope that this passage will be modified in a manner that more accurately represents the status of paleontological studies in the region. BLM (or any representative of BLM) cannot ignore the interests of the University of New Mexico, the New Mexico Bureau of Mines and Mineral Resources, the University of California, the University of Arizona, the University of Minnesota, the University of Texas, the Carnegie Museum of Natural History, the Los Angeles County Museum of Natural History, the University of Colorado, the Museum of Northern Arizona, and others. It is of some concern that BLM, well aware and frequently a participant in efforts to rationalize

paleontological mitigation efforts undertaken at the Farmington coal-paleontology conference workshop, the Los Angeles County Museum National Academy of Sciences proposal effort and numerous more informal contacts, would take such a narrow, poorly thought out and inappropriate position.

Environmental Consequences

Paleontology

Paleontological occurrences most affected will be in the Fruitland Formation wherein by far the bulk of coal resources lie. BLM evidences a lack of appreciation for this fact when discussions stray up and down the stratigraphic column into rock units that have little or anything to do with the Fruitland. Whether or not the record of the transition of dinosaur dominated to mammal dominated communities even exists in the San Juan Basin (and this transition has not been demonstrated), this fact has little if anything to do with the mining of Fruitland coal. No where will the uppermost Kirtland or Ojo Alamo or Nacimiento be stripped to get at Fruitland coal. For some reason, BLM seems intent upon arguing this fact.

Similarly, on page 3-9 BLM raises the spectre of once again ignoring well established and recognized interests and experience in San Juan Basin paleontology which can only have a detrimental effect on New Mexico and other established institutions and programs. This fact raises serious questions as to the intentions of BLM to seriously and openly treat paleontological mitigation. We are all the more surprised by BLM's stance in the light of BLM's continued participation through several years of

58.54

discussions in appropriate mitigation. We strongly object to BLM entering into any agreements without consultation with the State of New Mexico, especially when these agreements would seriously impact ongoing efforts to rationalize mitigation procedures and especially when BLM does not seem concerned with these impacts nor aware of appropriate management techniques.

58.55

Noncompetitive Coal Lease Issuance

The paleontology offered in this section, p. 3-28, offers little of substance.

Competitive Coal Lease Issuance

Little of substance in this section relating to topography and mineral resources or paleontology (pages 3-58 and 3-59).

Impacts - Minimum Surface Owner Conflicts

Pages 3-36 and following; little of substance.

Alternative Mitigating Measures

Paleontology, page 3-86.

Once again BLM seems to have ignored everything that has transpired in New Mexico over the last several years and in which BLM actually frequently participated. We are perplexed by this lack of either understanding of what has occurred regarding proposed and actual paleontological mitigation programs and discussion or the inclination of BLM to go it alone and formulate its own ill conceived measures.

We are perplexed as to how BLM can ignore available experience in the San Juan Basin without availing itself of

opportunities for consultation before offering poorly thought out ad hoc solutions for the paleontology conundrum.

This last fact is all the more disconcerting since BLM has not consulted the major participants in studies of the "fossil forest" nor availed itself of extant research data for this area. Similarly, BLM seems to avoid for whatever purpose(s), the fact that the only available set of mitigation procedures and significance criteria available for paleontological mitigation are the New Mexico Procedures available and known to BLM. Indeed, the initial discussions at Farmington that led to the development of the New Mexico Procedures, and continued informal discussions with BLM, included BLM participation.

Once again, the BLM treatment of paleontological mitigation seems flawed when contrasted with New Mexico's own efforts towards a reasonable approach to this serious set of issues.

Consultation and Coordination

Table 4-1, p. 4-6 lists Governor Bruce King; shouldn't Governor Anaya be listed as well?

P. 4-48, comment 3.2; it seems odd to use a "formula" of 13.5 localities per square mile for calculating the number of localities in an area, "where there are no known localities." This does not seem reasonable.

P. 4-48 and 4-49, comment 3.3. This comment by BLM is contrary to stated perspectives noted above in the DEIS. We are now completely uncertain as to what BLM's paleontological perspective is.

P. 3-7, comment 328; BLM offers the following unusual comment regarding the New Mexico Paleontology Procedures:

"The State of New Mexico's voluntary Paleontological Mitigation Program generally shares the same goals as the Bureau, however, it is not compatible with present BLM policy and as such has not been adopted by the Bureau."

We are perplexed as to why the New Mexico Procedures cannot be adopted or adapted to BLM paleontological mitigation needs. Since the goals of BLM are shared with the State of New Mexico regarding paleontological mitigation, any reasonable expectation would see BLM using the New Mexico program for an adequate mitigation formula. It is difficult to understand how if the goals are parallel, the policy resulting from these goals are not compatible.

Page 4-51; comment 3.10, we are not aware that the Mancos will be mined for coal.

Page 4-51 and 4-52; comments 3.11 and 3.12, these answers are not acceptable and simply do not reflect reality in the analysis of fossils associated with coal sequences in the San Juan Basin. Since BLM has studied few "sites" with any intensity, except those that BLM seems taken with for its own, non-mining related research interests, it is difficult to understand then, how BLM can appraise the significance of any paleontological occurrence if it uses the stated criteria in its answer to the queries of 3.11 and 3.12.

Similarly, we are struck by Appendix A-6, pages A-67 and A-69 listing site specific impacts to PRLAs. Paleontologic sites are grouped in four classes, I-IV and we assume that the most

significance is attached to Classes I, diminishing in some way to Class IV. In all, some 26 leases are listed. Only three class I sites are present! Only 75 Class II sites are listed. Page xiv of the Summary lists 47,020 acres included within the PRLAs. Thus, using BLM's own criteria, which seems applicable despite the lack of detailed study, or one Class I site per 15,673 acres and one Class II site per 613 acres! This hardly indicates a density of significant paleontological sites on the PRLAs.

29



TONEY ANAYA
GOVERNOR

ROBERT McNEILL
SECRETARY

ROBERT L. LOVATO, M.A.P.A.
DEPUTY SECRETARY

JOSEPH F. JOHNSON
DEPUTY SECRETARY

Steven Asher, Director

MEMO

TO: Mark Jones, Program Support Bureau

FROM: Bill Blankenship, Air Quality Bureau

SUBJECT: Comments on the Second Draft EIS to San Juan River Regional Coal

The Air Quality Bureau has reviewed the above mentioned document and offers the following comments:

1. On Page 3-5, reference is made to a calculated annual increase in ambient TSP concentrations of $5\mu\text{m}/\text{m}^3$. Then Table 3-1 which occurs on the following page is referred to in the context of this calculated annual increase. This is misleading because Table 3-1 contains 24-hour average concentrations. The table should be labeled as such to avoid confusion.

2. The statement is made at the bottom of Page 3-5 that the calculated increased TSP concentrations from this alternative would not result in a significant air quality impact based on the use of the NAAQS and PSD standards as a measure of significance. The EIS should show the calculated 24-hour concentration average and the PSD increment values to support this statement.

3. On Page 3-85 alternative mitigating measures are given for air quality effects. The EID drafted four such measures for possible use by the BLM on coal leases. Two of our four proposed measures have been included in the EIS; however, the proposed measure to require best available control technology on all mining operations emitting 100 tons per year or more of particulate matter has not been included. We ask again that this be included as an alternative mitigating measure.

4. In comment 1.15 on Page 4-24, the statement is made that modifications were made in the CDMQC model to consider rural air quality conditions. The last sentence on Page 4-5 states: "The CDMQC model was originally developed in an urban area and was not modified for use in a rural scenario." The conflict here needs to be resolved.

5. In comment 1.20 on Page 4-26, the statement is made "a determination has not been made as to whether NMEID will require PSD permits for coal mines". This is not true as stated. The federal PSD regulations in effect at this time, and the proposed New Mexico PSD regulation, require surface coal mines which have emissions greater than 250 tons per year of particulate matter emitted from their associated coal preparation plants to obtain a PSD permit.

6. Table 1-8 on page 1-39 notes that New Mexico ambient air standards could be exceeded unless Best Available Control Technology is applied. We repeat here our comment on the original DEIS regarding exceedances:

PREDICTED EXCEEDANCES OF THE TSP AMBIENT STANDARD

The New Mexico 24-hour particulate standard is predicted to be violated under each coal leasing alternative except the no action. The frequency of exceedances is not predicted. Since the modeling analysis used in the DEIS was of necessity a region-wide approach, it is difficult to interpret the reliability of the site specific predicted violations. Certainly the large grid spacing used (5km) could mean higher violations were missed.

Before an air quality permit can be issued to any of the proposed surface mines, a modeling analysis must be performed that indicates the New Mexico particulate standards will not be violated at all or the federal standards more than once. Such modeling must be approved or performed by the Bureau. The possible cumulative effect of emissions from a proposed mine interacting with existing emissions from other sources must be considered in the analysis. Since such an analysis will be site and source specific, it will differ considerably from work performed in the DEIS, and should more accurately predict the affect on air quality due to surface coal mining activities.

Responses to comment letter #58.

- 58.1 Assumptions 5 and 7 on page 3-2 are not concerned with market analyses but are legal requirements for due diligence. Analysis of coal markets was considered when leasing targets were set. The DEIS analyzes a range of impacts which reflect a reasonable expectation of market variables.
- The types of impacts identified in the EIS are projected to occur during mining operations. Any changes in market conditions resulting in a delay of coal production would result in a delay of those impacts. Consecutive tract production, slowdown, or a temporary shutdown of coal production would result in a continuation of those impacts at that level of development.
- Because of a number of variables, we realize that there may not be a constant market for all of the coal that could be leased. This could be true regardless of the level of coal that might be selected for sale by the Secretary of the Interior. Because of these factors, it is assumed that market conditions at any one time would determine when, where, and if the coal would be developed. Impacts resulting from unfavorable market conditions are noted above.
- 58.2 Support for the two assumptions stems from the analysis that was made in the Star Lake-Bisti Regional Coal Environmental Statement that was published in 1979. That document identified the need for a railroad to economically transport coal from the San Juan Basin and a 230 kV transmission line to provide low cost energy to operate coal mining equipment and associated facilities. These needs or demands will eventually be satisfied when the economic incentive is sufficient to cause companies to come forward and construct such facilities. Given the information available at the time this document was written, the assumed 1987 completion date for the railroad was determined to be realistic.
- 58.3 Costs of reclamation are developed in the mine and reclamation plan for each tract (see response to comment 50.1).
- 58.4 The major emissions from coal mine activities are fugitive. These, by definition, are difficult to control and normally are exempt from the PSD permit process.
- 58.5 Particulate matter (TSP) is usually the only pollutant generated in large enough quantities by surface mines to have a significant impact on regional air quality.
- Other pollutants such as sulfur dioxide, nitric oxides, carbon monoxide, hydrocarbons, ozone, and lead, resulting from the mining operations would be immeasurable on a regional scale and considered insignificant. Impacts from burning the coal and the discussion of chemical pollutants are addressed in the New Mexico Generating Station EIS (USDI ELM 1983) and summarized in the Final Cumulative Overview (USDI ELM 1983).
- 58.6 If all the available amounts of the heavy metals and some of the other chemical species were aerosolized during mining, the ambient air concentrations would be very low.
- 58.7 The increase was modeled for each alternative and was added to the background value; this sum was then compared to the ambient standards. The PSD permitting authority is responsible for allocating what development activity receives the right to consume PSD increment.
- 58.8 It is correct that fugitive dust is normally exempt in determining PSD applicability. As discussed on page 2-2 paragraph 4 of the Draft San Juan River Regional Coal EIS, October 1983 the fugitive emissions are tracked in the EIS.
- 58.9 Emission factors cannot be validated until the mines are in operation and a monitoring system is operated. The modeling was done using the best available estimates of emission factors and other input data.
- 58.10 The tract delineation reports at ELM offices in Farmington and Albuquerque, New Mexico contains the accurate estimates for reserves. It is generally plus or minus 20 percent for the preferred alternative (Minimum Surface Owner Conflict Alternative) and other high confidence tracts, but substantially lower on some of the low confidence tracts in the High Alternative. The 1.4 billion tons in place for 26 PRLAs was an error and actually referred to recoverable reserves on the PRLAs and two associated leases. The correct number is 2.3 billion tons. The 2.2 billion tons represented the sum of the PRLA (1.4) plus No Action Alternative (0.8) and has consequently been revised. The accuracy in reserve calculations for the PRLAs is about the same as the competitive leases; the above errors were misinterpretations of correct numbers. The accuracy of the No Action Alternative may be somewhat less because private coal is involved. Also see response 58.1.
- 58.11 The Star Lake-Bisti Regional Coal Environmental Statement fully analyzed potential highway and rail-coal transportation systems including the Con Paso or Navajo Railroad route in 1979. The State of New Mexico Transportation Department participated in that effort. In addition, a separate environmental document was prepared for the Navajo Tribe on the Navajo Railroad route.
- 58.12 "taxed" as defined in this sentence refers to stressed. The text has been revised.

- 58.13 Often when impacts are analyzed on a regional scale they appear less severe than when they are analyzed on a local level. Analyzing an impact such as relocation from a local or individual perspective is more significant to the individual than if the impact is analyzed as a percentage of a regional total. For example, if BIM were analyzing the impact from an individual's perspective his entire family must move. If BIM were analyzing this impact on a regional scale, perhaps 3 percent of the individuals living within a region may be required to move. If the impact is analyzed from the perspective of the United States, fewer than .01 percent of the population would be required to move.
- 58.14 Production estimates for the No Action Alternative were developed in consultation with several State and Federal agencies. These were discussed in public meetings in Albuquerque and Farmington on February 23 and 24, 1982 respectively. Rationale for the estimates used are discussed in a memorandum from the BIM State Director, New Mexico, to the BIM Director, dated March 16, 1982. Some commentators responded that the levels are too high; others that the levels are too low.
- 58.15 Please refer to Table 1-6.
- 58.16 Although fossil localities and fossil collection site estimates are used in the EIS, both terms refer to fossil material. Although a single term was not used consistently throughout the document, there was no intent to confuse the reader. The emphasis of this section, is that paleontological resources are present and real and would be significantly impacted if mining activities were to occur. The amount of paleontological resources that might be investigated would be dependent upon the availability of manpower and funding to conduct studies. This varies from time-to-time and is not subject to predictions. Questions as to whether the paleontological material is important are answered by referring to the primary point of impact assessment. This point is concerned with the availability of this resource for future research and investigation, which then allows for the subsequent, orderly analysis and findings to determine the significance of the paleontological material, a process approved and followed by knowledgeable and experienced paleontologists.
- 58.17 The 3,157 figure mentioned represents AUMs (See Glossary, page GL-1) not cattle numbers. The 3,157 AUMs produced by the 25,000 acres would support 263 cattle yearlong. Assuming as you did, that the total 25,000 acres was out of production each year [also if you assume that livestock operators in the area had 100 percent calf crops, 100 percent steer production, and no cycles (bad years) in the cattle business] annual losses (\$500/head) to the regional economy would be \$131,500.
- 58.18 The trauma and social pressures associated with rapid community development have been shown in several areas of the country to have the consequence referred to. The reasons why are not clear in all cases. However, it is believed that the consequence may be even more pronounced where the lifestyle has been extremely traditional.
- 58.19 See the response to comment 58.15.
- 58.20 See the response to comment 58.16.
- 58.21 See the response to comment 58.18.
- 58.22 Presently railroad construction to the Lee Ranch area for private coal development has started. Eventually the demand for coal and the economic incentive will be sufficient for a company to come forward to build the Star Lake to Bisti segment.
- 58.23 The acreage disturbed for facility construction is presented in Table 1-4 by alternative.
- 58.24 See the response to comment 58.16.
- 58.25 The 4,955 AUM figure is a cumulative figure produced on the 40,435 acres involved. Without detailed mine plan information, yearly AUM losses are not predictable. This information is not necessary for a reasoned choice among the alternatives.
- 58.26 The text has been revised to clarify the statement regarding the impact to recreation from population increases.
- 58.27 See the response to comment 58.15.

58.28 See the response to comment 58.25.

58.29 Of the eight Bypass tracts, the level of intensity of the inventory for cultural resources ranges from 1 to 15 percent of the tract (see Table 2-9). From this sample of the tracts 199 sites have been located. Using available data from both nearby surveys and the predictive model produced by Kemner (1981), between 1,148 and 1,680 sites are predicted in these tracts. Because approximately 90 percent of the tract has not been inventoried, there is a difference in recorded and predicted sites.

58.30 See the response to comment 58.16.

58.31 See the response to comment 58.15.

58.32 See the response to comment 58.16.

58.33 See the response to comment 58.25.

58.34 The significance of cultural resources is determined through its possible inclusion in the National Register. Table 2-9 indicates how many of the recorded sites within the tracts, including the tracts identified in the minimum surface owner conflict alternative, have been determined eligible or not eligible for inclusion in the National Register.

58.35 See the response to comment 58.15.

58.36 See the response to comment 58.16.

58.37 See the response to comment 58.15.

58.38 See the response to comment 58.16.

58.39 See the response to comment 58.25.

58.40 The acreage figure on page 1-8 is for the PRLAs only. As stated on page xiv the 47,020 is the No Action Alternative plus the PRLAs (25,000 + 22,020 = 47,020).

58.41

The acreage figure on page 1-11 is for the Bypass Alternative only. As stated on page xviii the 53,170 includes the No Action Alternative plus PRLAs plus the Bypass tracts (25,000 + 22,020 + 6,130 = 53,150). The text has been revised.

58.42

The acreage figure on page 1-12 is for the Minimum Surface Owner Conflicts Alternative only. As stated on page xix the 66,327 acres includes the No Action Alternative plus PRLAs plus the Minimum Surface owner tracts (25,000 + 22,020 + 19,302 = 66,322). The text has been revised.

58.43

The acreage figure on page 1-12 is for the Target Alternative only. As stated on page xx the 82,997 acres includes the No Action Alternative plus PRLAs plus the Target Alternative (25,000 + 22,020 + 35,977 = 82,997).

58.44

The acreage figure on page 1-13 is for the High Alternative only. As stated on page xx the 115,661 acres (not 115,611 as stated in the comment) includes the No Action Alternative plus PRLAs plus the High Alternative (25,000 + 22,020 + 68,641 = 115,661).

58.45

The BLM recognizes the fact that the paleontological stipulations as stated in the standard lease form and the DEIS have shortcomings. (Please refer to Committed Mitigation Measures in this Final EIS.) At this point in time we can only make a general statement regarding mitigation procedures. However, the BLM is planning development of a comprehensive plan for paleontological mitigation procedures in cooperation with other concerned entities. Toward this end, the State Bureau of Mines has developed an excellent document which will be used as a basis for a final set of procedures. Input from other affected entities is, of course, an essential element for effectual management. This can only be accomplished if these entities can set aside their disagreements and come together to achieve a common goal.

58.46 See the response to comment 58.45.

58.47 See the response to comment 58.45.

58.48 See the response to comment 58.45.

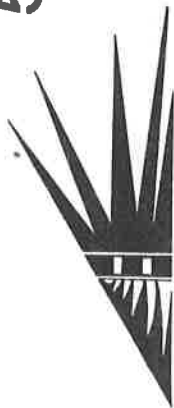
58.49 See the response to comment 58.45.

- 58.60 In a strictly academic sense, those involved in the field of evolutionary research are primarily interested in the biological and not the economical relevance of fossil associations with coal, gas, oil, or any other element in their depositional environment.
- Since other agencies and institutions have declared interest in certain mining-related research areas, the EIM has generally adopted a support and coordination role with them. In addition, the EIM conducts management-related research in areas affected by other types of impacts, such as oil and gas development, wilderness study areas, pipelines, power lines, land exchanges, land use studies, and protection of paleontological resources in Areas of Critical Environmental Concern.
- The EIM has, in conjunction with other academic institutions, produced dozens of display and study quality specimens, and have published findings in several major scientific journals. Significance assessment and procedural decisions are more appropriate and effective at the mine plan stage when more pertinent data can be appraised.
- 58.61 See the response to comment 58.16.
- 58.62 The text and Table 3-1 have been revised to reflect this comment.
- 58.63 The 24 average including background is $<100 \text{ ug/m}^3$ as shown in Table 3-1. The potential consumption of PSD increment was computed at Chaco Canyon to be $<12 \text{ ug/m}^3$. This is explained in the ECOS Technical report.
- 58.64 The text has been revised.
- 58.65 Appendix G has been revised to state that the CDMQC was modified.
- 58.66 The statement refers to mines that produce less than 250 T/y of non-fugitive emissions. Currently it is the intent of the State of New Mexico to require a PSD permit for any mine activity that produces 100 T/y or more of non-fugitive emissions.
- 58.67 We agree with your comment this will be analyzed when the mine plans are submitted.

58.50 The 570 fossil localities on page 1-32 should be 271 and the text has been corrected. The figures in the summary are cumulative, they include the fossil localities of the No Action and PRLA Alternative. As such, fossil localities (page 3-10 Table 3-3) are No Action 1,100 plus PRLA 1,137 plus Bypass 271 equals 2,058 localities. Another example: No Action 1,100 plus PRLA 1,137 plus Target 1,400 equals 3,637 localities. The same is true of surface acres disturbed; to get the cumulative total add each individual competitive leasing alternative to that of No Action and PRLAs. Note the footnote at the bottom of the tables in Chapter 3 and Table 1-8 that the numbers stated are attributable solely to that particular alternative they are not cumulative as the summary is.

- 58.51 See the response to comment 58.50.
- 58.52 See the response to comment 58.50.
- 58.53 See the response to comment 58.45.
- 58.54 See the response to comment 58.45.
- 58.55 See the response to comment 58.45.
- 58.56 The text has been revised.
- 58.57 See the response to comment 58.16.
- 58.58 See the response to comment 58.45.
- 58.59 The State Mitigation Plan referred to was considered unacceptable for the following reason: The earlier version of the document was "voluntary" and left to the discretion of industry. In an area where there are hundreds of documented fossil occurrences with high significance potential (the Gateway Mine in the Bisti has reportedly not uncovered any fossils of note since its activation on State section 32). The voluntary nature of this program could reduce the effectiveness of mitigation.
- The latest version of the Bureau of Mine's mitigation plan is no longer voluntary and appears to be well thought out and coherent. However, other involved entities such as universities, museums and government agencies have not had the opportunity to review this plan and provide substantive input. To this end the EIM will soon hold meetings in order to bring together all factions (within the discipline) to produce a mutually agreeable document using the State Mitigation Plan as a foundation.

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SOUTHWEST RESEARCH AND INFORMATION CENTER

November 21, 1983

Mr. C. W. Luscher
State Director
Bureau of Land Management
c/o Farmington Resource Area
900 N. La Plata Highway
Farmington NM 87401

Dear Mr. Luscher:

This letter conveys our comments on the "Second Draft San Juan River Region Coal Leasing Environmental Impact Statement" and the "Final San Juan Basin Cumulative Overview". These comments are submitted by Southwest Research and Information Center, Rio Grande Chapter of the Sierra Club, Committee on Coal, New Mexico Audubon Council, and Crownpoint Citizens Alliance. These groups also endorse and incorporate by reference the comments on the two documents submitted by Environmental Defense Fund, Natural Resources Defense Council, and National Wildlife Federation. We also would like to include by reference all concerns raised in our comments on the first drafts of these two documents; not all concerns left unanswered by the present editions can be repeated in detail here.

We appreciate this opportunity to comment on the Second Draft, and the effort and expense put into this reissuance by the Bureau of Land Management (BLM). However, the majority of our problems with the First Draft were not remedied by changes made in the Second. Sheer mass of paper and repetition of positions cannot substitute for the revised proposals and deeper analysis that could have been included in the Second Draft but were not.

The major change from the First to the Second Draft was the addition of alternatives; additional alternatives were clearly required for adequacy under the National Environmental Policy Act, but we do not think the level of analysis of these alternatives is sufficient to qualify as the "hard look" required by case law. We applaud the reduction of the leasing target and BLM's retreat from the position that issuance of the PRLA's is "non-discretionary", but we feel both of these steps need to be taken further to their logical conclusion: there is no need for competitive leasing at this time, and there are serious legal and environmental problems with the preference right lease applications (PRLA's) that BLM has a duty to remedy by denying improperly made applications and strongly conditioning the remaining preference right leases.

When Alison Monroe wrote to BLM asking for additional public meetings and hearings on the Second Draft, you answered:

"We are providing the Farmington hearing for the purpose of allowing those who may have something additional to add to their comments on the limited amount of new information and analysis that has been added to the Second Draft. By now, you may have been able to review the new draft and will see the similarity to its predecessor."

We agree that the amount of new information and analysis is limited, and thus hope that you will not take the brevity of our attached submission as an indication of the depth of our concern. Our basic concerns remain the same, and can be summarized by saying that BLM has neglected other values and resources on the public lands and the requirements of pre-sale land-use planning in its push to lease coal in New Mexico.

We recommend that BLM reissue the coal EIS in draft form in response to the issues raised in our attached comments, revise the land use plan to comply with FLPMA and other laws, issue a comprehensive environmental impact statement on the "San Juan Basin Action Plan" and other alternatives for development of Northwest New Mexico, evaluate the PRLA's for compliance with the requirements of the Mineral Leasing Act, put strong stipulations on the PRLA's, and delay the competitive lease sale until land-use planning is carried out properly and there is a need for the coal. Thank you for your consideration of our views.

Sincerely,

G.M. for D.S.

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COMMENTS ON THE SECOND DRAFT
SAN JUAN REGIONAL COAL LEASING
ENVIRONMENTAL IMPACT STATEMENT

By Alison Monroe

Southwest Research and Information Center

November 21, 1983

I. Introduction

The Bureau of Land Management (BLM) plans to lease some 3.1 billion tons of coal in place in the San Juan Basin of northwest New Mexico in 1984--2.2 billion tons of Preference Right Leases and 916 million tons of competitive leases. Two drafts of an Environmental Impact Statement proposing these actions, the San Juan River Regional Coal Leasing Environmental Impact Statement, were released by BLM for comment, in November 1982 and September 1983 respectively. These comments address the second draft of September 1983 and should be read in conjunction with comments on the November 1982 statement by Sierra Club Rio Grande Chapter and other groups. A companion volume to the coal leasing statement, the San Juan Basin Cumulative Overview, was issued in final form September 1983; comments on that companion volume are included here.

II. Summary

The most important deficiencies in substantive analysis in the First Draft were not corrected in the Second Draft. These include:

No honest analysis of how much coal would be produced where in the absence of federal leasing:

No determination of where and whether reclamation is technologically and economically feasible:

No analysis of cumulative impacts on Native American lifestyle of all BLM projects, and scanty analysis generally of impacts on Native Americans;

Insufficient detail and practicality for mitigation measures to resolve conflicts including occupancies, archeological and paleontological sites, water sources, wilderness, and wildlife;

Incomplete and inconsistent unsuitability analysis;

No estimate of costs and no meaningful discussion of environmental impacts of alternative lease stipulations for the PRLA's;

No commitment to review legal problems with the PRLA's.

Three alternatives were added; a No Action Alternative in which neither PRLA's nor competitive leases would be issued; an "Alternative Lease Terms Subalternative" and an "Exchange or Legislation for Selected PRLA's Subalternative". However, all three new alternatives receive only superficial and flawed analysis.

Although several additions were made to the text which resulted in some improvement in public understanding of the impacts of the proposed leasing, the majority of these are minor and the analysis remains largely as it was.

A Comments and Responses section was added to Chapter 4. Most but not all issues we raised were mentioned there; however, responses made to most of our comments were either a reiteration of differences of opinion between ourselves and BLM or an assertion that the problem was outside the scope of the Environmental Impact Statement and/or would be addressed at a later stage.

III. New alternatives

A. No action alternative

This alternative is summarized on p. xii-xiv and on p. 3-5 to 3-25. It does not imply no coal development whatsoever, which some would argue to be a reasonable no action alternative for comparison to other actions) but appears to refer to development of existing federal and state leases and proposed mines under contract commitment or mine plans" and covers the development of "800 million tons of in-place coal" (p. xii). No references other than "consultation" are given for the amount of coal, number and location of mines, estimated numbers given of archeological and paleontological sites disturbed or any other impacts, and no map is given. No references or assumptions are given explaining why production would increase from approximately 19 million tons in 1982 to 39.4 million tons in 1987 and then decrease to 16.5 million tons.

Several problems with this alternative are immediately apparent. First, no Navajo or private coal is mentioned, nor is any reference made to coal leased outside New Mexico in the San Juan Basin or outside the Basin in New Mexico. Leased Navajo coal in the Burnham and Navajo properties alone amounts to 1.9 billion tons of stripable coal (Louis Martinez, State Land Office, personal communication, October 25, 1983). Second, why would production double in 4 years, let alone collapse to half this rate in another 13 years? There are no customers identifiable for such quantities of coal on such short notice. Two studies done for NWERDI (econometric and end-use

59.1

modeling) estimated demand for New Mexico coal at 29.5 million tons or less by 1990.

59.2

How did BLM obtain quantitative estimates of acres disturbed (3-9), cultural sites disturbed, etc.? Possibly by using a standard quotient of sites, acres, etc. per generic ton. Evidence of this is in BLM's lazy assertion that "The alternatives do not differ from another by the nature of impacts, only in magnitude. The alternatives will produce impacts generally in proportion to the coal produced" (p. xi).

Such oversimplifying assertions about the differences between alternatives cannot substitute for site-specific analysis of the areas opened up for development under the different alternatives. The effect of this rather slipshod analysis of the No Action Alternative is to obscure the fact that leasing, although it may not increase the overall amount mined, does open up new areas to the potential for mining. Impacts of coal mining are not simply a function of tons mined, but depend on where the coal is mined and what conditions are put on the mining. If impacts were "generic", we could dispense with Environmental Impact Statements and land use planning, and simply lease tracts at random and let the market decide where coal is developed, as some planners of narrow vision would propose. However, these impacts are not generic.

For example, the PRLA area (the Fruitland formation from Bisti to Torreon), which also contains most of the competitive leases in the Minimum Surface Owner Conflicts alternative, involves greater reclamation, paleontological, and wilderness impacts than coal development in e. g. the La Plata, Lee Ranch, or Gallup areas, and is also the furthest from transportation and existing infrastructure. BLM acknowledges differences of this nature implicitly when it states that denying ("exchanging") the PRLA's altogether would "direct coal development away from the areas of highest paleontological, cultural, and socioeconomic conflict to areas of less conflict" (3-54).

Coal development under different jurisdictions can also make a significant difference in environmental and social impacts. Massive leasing on the BLM side of the reservation boundary tends to direct development away from competing mines and infrastructure planned for development of Fruitland coal on the Navajo Reservation side. Based on past experience BLM could generalize that Navajo training and job preference would be much more likely to occur and result in more Navajo employment under Tribal jurisdiction than on public lands. The authors of the NMGS DEIS noted that the percentage of Navajo employment was much higher at the Four Corners power plant on the Navajo reservation (61%) than at the comparable San Juan plant off the reservation (7.2%; NMGS DEIS, p. 3-26).

Analysis of this "No action alternative" analysis doesn't seem to have gotten to the first stage of headscratching; instead of wondering whether development at Lee Ranch, Burnham, and La Plata would be

better or worse than at Pueblo Pintado, Crownpoint and Nageezi, or why, the authors seem to have cobbled together some generalized verbiage from the First Draft's No Action Alternative (which proposed leasing 2.2 billion tons of PRLA's) with some unreferenced and unsupported numbers. This cobbling leaves some bare spots: for example, tables 3-12 and 3-13 have no information on rights of way affected by mining in the no action alternative ("data not available", table 3-9 has no information on wildlife habitat disturbed in the no action alternative ("unknown"), and tables 3-1 and 3-1a have no information on visibility reduction due to the No action alternative, except that it would be less than in the PRLA alternative.

A reasonable analysis of the impacts of not leasing on coal production, jobs, taxes, and other conditions requires a consistent and reasonable analysis of coal supply and demand, which neither the First Draft nor the Second provides. We had hoped that a true No Action alternative would result in some BLM analysis of these issues. However, BLM has not made any significant changes in its discussion of the need for coal, and denies the need for any. Figure 1-1 is the same in the First and Second drafts with the addition of a single column for 1982 production. An unreferenced table is not sufficient analysis to lay the foundation for a major alternative such as the No Action Alternative. ("Coal baseline figures were derived under consultation with state and federal agencies" (Second Draft, p. 1-4) is not sufficient as a reference.)

The Federal Coal Management Program FEIS, and DOE coal goals were said in both the first and second draft to have established a need for federal coal leasing (1-1, see also Second Draft 4-3). Sierra Club commented on the inadequacy of both the former and latter, but no response can be found in the second draft to our comments nor to EDF's comments on the DOE goals (Final Cumulative Overview, p. CL-167-168 and CL-106)

59.3

Both the First and Second Drafts cite "extensive public hearings, analyzing potential production from planned and existing coal mines in the region, and consultation with state and local officials and the Departments of Energy and Justice" as leading to the establishment of the leasing target. Testimony by Dave Marcus, Allison Monroe, and many others at hearings including the May 21 Congressional Field hearing in Santa Fe has criticized the calculations used in setting the leasing target and has used estimates of potential production from planned and existing coal mines (by federal and state agencies such as BLM itself, Minerals Management Service, Office of Technology Assessment, and EMU) to demolish the alleged need for leasing (as we thought) utterly. The leasing target was not established "in response to" "extensive public comment and discussion" (p. 4-168), but rather in the teeth of it.

We have argued that properly calculated supply in the basin would exceed demand until approximately 1995 without PRLA leasing, let alone competitive leasing, and that leasing will not increase coal production but rather shift it to areas already leased. See Final

Cumulative Overview pages CL-104-110. BLM's major response to this comment was as follows (p. 4-121):

The statement that mining of newly leased tracts would occur at the expense of mining that would occur elsewhere(sic). We don't believe that this will occur. The BLM does not have information that supports such a statement. It is assumed that current and projected mines under permit or contract commitments would remain in production to honor legal obligations. Any expansion of existing mines would be at the discretion of the company holding the lease and the need to meet contract commitments. New production would be based on market conditions and contract agreements and not to the detriment of existing and permitted operations. The text will remain as written.

The BLM does have information to support such a statement in the comment letter cited; in the testimony of the May 21 hearing, where union coal miners from the Raton area opposed coal leasing in the San Juan basin on the grounds that it would shift production from their area to the basin; and in numerous letters from environmentalists beginning in Spring 1982. We believe our allegations that BLM numbers for production with and without leasing are unsupportable at least deserve a response (see standard types of "responses to comments" 40 CFR 1503.4 (a)).

B. Alternative Lease Terms Subalternative

In a decision about Preference Right Lease Applications which has been quoted extensively in this statement and comments thereon, Judge June Green stated that:

...it is the setting of the lease terms which allows the Secretary maximum discretion. Accordingly, if the Secretary decided to set lease terms, he should have before him a comprehensive EIS which includes a careful examination of possible performance lease standards, alternative methods for meeting those standards, and estimated costs of compliance.

NRDC v. Berkland, 458 F. Supp. 937 (D. D. C. 1978).

In a first pass at complying with this aspect of the decision, BLM listed some 24 alternative lease stipulations on p. 3-85 to p. 3-82. However, this new alternative would be more responsive to requirements for alternatives in an EIS if it had more specific information about the relative environmental impacts of these stipulations versus those actually proposed for the PRLA's (Appendix I) and if it presented them side by side with maps, or otherwise allowed a simple comparison of the proposed action with the alternative. As it is, only a careful reader can find both the alternative and proposed lease stipulations and know which is the proposed and which is the non-proposed action, and he can only guess at the site-specific and cumulative impacts of the two courses of action based on a long familiarity with such

documents as the PRLA Environmental Assessment and its maps.

Furthermore, no estimate of costs of compliance with either the proposed or alternative lease stipulations is attempted, as Berkland required.

Several questions arise about the "alternative mitigating" stipulations. The air quality measures defer meaningful decisions to either the mine plan stage or after mining actually takes place, based on an alleged inability to predict visibility impairment (3-85). Why is Bisti 6 the only tract with wilderness-related stipulations when Bisti 1 and 2 also adjoin Bisti WSA(3-88)? Would it not be more effective in protecting rare sacred plants to declare the areas they grow in unsuitable(3-89) then by collecting their seeds for the planting mixture? (They may or may not grow in reclaimed areas, and they may lose some of their usefulness away from the original site). If a memo of understanding was signed by BLM, the Navajo Tribe, and the BIA regarding alternative ways of resolving occupancies on public lands, why is further BLM discretion implied before "adopting" it?

Lease stipulations dealing with occupancies and Navajo employment have some potential to defuse the obvious controversies about impacts on Navajos. We would recommend that BLM adopt stipulations preventing surface disturbance or subsidence in Indian-occupied quarter sections, providing compensation for loss of grazing rights and improvements, and providing for Navajo preference in training and hiring.

Although BLM is doubtful (4-129), we think that requiring Navajo preference in hiring and training could be within BLM's discretion, as courts have upheld a wide variety of lease stipulations in the public interest (Pring, George, 1982, "Power to spare: Conditioning Federal Resource Leases", Natural Resources Lawyer, vol. XIV, no. 2, p. 305-330). The model stipulation regarding hiring on p. 3-89 defers too much analysis to the mine plan stage, but could be rewritten to provide a clearer idea of what percentage of Navajos could be expected to qualify for jobs of what type.

A lease stipulation such as that on 3-91 to provide compensation and assistance to relocated people would be far preferable to the vague and unworkable stipulations in the PRLA lease terms (Appendix I). However, some people would probably still not want to move, and such a stipulation would not settle legal controversies about the priority of "unauthorized occupants" with respect to preference right lease applications. We are opposed to any proposal that threatens to involuntarily relocate Indian occupants of any kind.

We are pleased that BLM is beginning to consider devising stipulations to protect the occupants and resources on the PRLA's, but consider these alternative stipulations as well as those proposed in appendix I only a beginning. As we discuss below, it is important from a policy standpoint as well as for proper assessment of the PRLA's to have clear, enforceable lease stipulations whose costs and environmental impacts can be estimated.

C. Exchange or legislation for some or all of the PRLA's

We believe that the objectives proposed for this alternative (the elimination of surface disturbance in occupied areas, in USA's or the Fossil Forest) could be accomplished through lease stipulations preventing such mining. Preventing mining in such areas could defuse much of the controversy over San Juan coal leasing, appears to be in the public interest, and would appear to be within BLM's discretion.

The environmental impacts of this alternative lack any supporting analysis or site-specific information, and are not consistent with the proposal. 14 families would be relocated under a combination of Partial PRLA issuance examples 1 and 2. Example 1 would prevent mining in all PRLA's listed by BLM as occupied, so why 14 families would be relocated is not at all clear (3-54).

Again, the move by BLM to consider action limiting the devastation created by the Preference Right Leases is welcome, but the analysis is scanty.

59.11

IX RECLAMATION

In response to our comments on the first draft, the BLM included several more paragraphs on reclamation in the Second Draft of the San Juan River Regional Coal Environmental Impact Statement.

We contend that SMCR 522(b) requires an assessment before land use planning of where and whether reclamation is technically and economically feasible. This would be a 21st unsuitability criteria, which although called for by the law was never made explicit in the regulations.

Much of the stripable coal between Bisti and Torreon is in badlands areas. Although a map in the PRLA EA shows general areas of badlands soil associations, none could be found in the second draft for competitive leases.

Badlands areas should have been found unsuitable for strip mining during land use planning.

59.12

The information in the Second Draft does not support a showing that reclamation is "technically and economically feasible" in the San Juan Basin. The San Juan and Navajo mines are not in badlands areas, and BLM allows that at least 5 more years of data will be needed to evaluate whether the vegetation will be capable of self-regeneration and plant succession, whether long term plant diversity will occur, and whether they will tolerate grazing. (The figure of 5 years is not supported; second draft, p. 3-9)

BLM further states (Second Draft, p. 3-11) that "Two mines in the San Juan Basin have been formally evaluated to determine whether revegetation is technologically and economically feasible under current regulatory standards: The Burnham Mine and the Gateway Mine." BLM states that at Burnham "The OSM concluded that if certain procedures were followed during reclamation, revegetation was technologically and economically feasible". As is mentioned in the Second Draft, the approval was conditional and could be revoked within 7 years. The stipulations required the company to present within that time experimental data sufficient to "affirmatively demonstrate a trend toward re-establishing vegetative communities on the mined lands equivalent to the vegetative communities on undisturbed, properly grazed lands..." (Special Stipulation no. 1, Jan. 11, 1980) We don't believe this demonstration has been made yet. Although the mine has experimental plots, the 1982 annual report on the Burnham mine notes that "No large scale reclamation activity has been conducted to date " since the active pit has not progressed far enough to warrant soil grading

We are disappointed at BLM's citing the State's approval of Gateway as showing that reclamation was economically and technologically feasible. The Sierra Club filed an unsuitability petition on that mine claiming among other things that the area was not reclaimable. The petition was denied and is being appealed. Testimony and affidavits by Robert Curry indicated that reclamation attempts would be likely to lead to hydrologic instability and increased erosion over the long term.

The Office of Surface Mining has noted many technical problems in the State's approval of that mine (Western Technical Center Oversight Evaluation Report of the New Mexico permanent program permitting operations, draft of August 1983). These included: insufficient data on quantity and quality of topdressing material, insufficient information on flood control structures, no determination of "probable hydrologic consequences", insufficient baseline groundwater data, allowing excessively steep slopes, and in general insufficient documentation of technical findings.

If BLM had reviewed more information on geomorphological aspects of reclamation, it would have been able to highlight controversial aspects of reclamation in badlands (see paper by Wells cited in our First Draft comments). The likelihood that inputs of water, mulch, fertilizer et cetera will establish vegetation in the topdressing does not guarantee that badlands erosion processes will remove topdressing and vegetation through gullying and piping. It seems unlikely that furrows and vegetation will be able to hold topdressing in place without constant maintenance.

Deep groundwater in the Bisti-Torreon strippable coal belt is of poor quality and has high total dissolved solids. It is likely to prove unsuitable for irrigation. BLM should determine whether vegetation can be established without irrigation, or if not, what supplemental water sources are likely to be needed for reclamation.

Although reclamation is a complicated subject, BLM needs to come to conclusions about it at this stage for NEPA reasons as well as because of SMCRA. If information is essential to a reasoned choice among alternatives and the overall costs of obtaining in are exorbitant, the agency should include a worst case analysis. Reclamation is particularly important to an understanding of impacts in this case because BLM has held out the hope that relocated people will be able to return to or use areas that have been mined. In the worst case, which certainly seems plausible, people will not be able to graze those areas again in their lifetime.

Conflicting estimates about when grazing will be allowed on reclaimed areas still remain in the Second Draft. (6 to 40 years, p. 4-129) (possibly after 6 to 10 years, 3-11).

V. Additional remarks

As noted above, most of our comments on the first draft were met with restatements of BLM's position rather than changes in the draft. This was also true of the Cumulative Overview. Due to time limitations and a word processor crash we cannot restate our position here with any completeness. A few selected comments on BLM's responses follow.

1. No meaningful response was made to our questions on relocation (where, for how long, who pays, who decides; 4-129). It is not practical to expect that people can be relocated in the same chapter or on reclaimed areas. It is not reasonable to rely on laws (such as water replacement requirements) to protect people who don't speak English and are not educated, in the absence of positive steps taken to protect their interests by the agency with the responsibility for this.

2. The MFP Update for coal was begun in 1980, after the regulations regarding transition land use plans were promulgated, and three years after the passage of FLPMA and FCLAA, which require comprehensive land use plans for coal leasing. It should have been a resource management plan, should have identified alternative levels of development, should have been accompanied by an EIS, should have accomplished meaningful unsuitability analysis, should have contained the results of surface owner consultation, should have accepted protests, and should have designated ACEC's. The plan was disorganized and difficult to understand, contained arbitrary decisions totally at variance with the analysis preceding them, was not distributed to the public, and was not accompanied by maps except at one office.

3. The cumulative overview should have been an EIS on the San Juan Basin Action Plan or the land use plan. If BLM "has no regional plan or program for the region" (FCO p. CO-17) it should make one and write an EIS on it.

4. Numerous other problems we noted in the CO were not addressed by changing it. For example: no analysis of new town, no analysis of cumulative water impacts, no analysis of synergistic impacts of air pollutants, no attempt to incorporate concerns of Native Americans through creative, interdisciplinary means such as by transcribing oral comments or interviews, in general a narrower definition of "significant" and "cumulative" than than found in the NEPA regulations.

5. Unsuitability analysis is still incomplete and contradictory. 77 paleontological sites not unsuitable or even mitigated under criterion 6. No areas found unsuitable or proposed for mitigation on the PRLA's under criterion 7, although National Register sites exist and more surely remain to be discovered. Although the EIS states that "unsuitability criteria have already been applied ... for areas surveyed for threatened and endangered species (p. 4-146), FWS says full application of criterion 9 has been deferred (CL-10 in CO). Table 1-5 in the Second Draft finds that Criterion 2 and 3 have "no effect" on the PRLA's, despite the numerous dwellings, graves, sacred sites and roads identified thereon in this EIS. The public has not been afforded a meaningful review of BLM's unsuitability analysis because it has

VII. RECOMMENDATIONS

always been a confused mess, differing from document to document and within documents. (4-167)

6. I paid some \$50 for copying the Requests for Final Showing and accompanying maps. They were not free of charge. SRIC and DNA do not embody or represent the whole public interested in the PRLA's. I did attempt to comment on the Requests for final showing lease terms in my comments on the first draft, but found they contained information at variance with the analysis there (4-166)

7. BLM erroneously states that "there are no laws that provide protection for areas of this status" (ACEC's)(p. 4-107). FLPMA states "In the development and revision of land use plans, the Secretary shall...give priority to the designation and protection of areas of critical environmental concern" (43 USC 1712 (c) (3)).

8. BLM erroneously states that "Population increases were not projected to increase to significant impact levels. Therefore, it is assumed that significant amounts of state funds, for community services, facilities, etc., would not be required." (4-124) See final cumulative overview, for example p. CO-7, where population growth in Farmington in 1985-1986 and "Potential inability of human services agencies to keep pace with demand" are found to be significant. Errors can result from splitting off analysis of "cumulative impacts" into a companion volume.

9. The special difficulties of involving Navajos in processes like EIS review ought to be acknowledged. BLM ought to quote from and respond to Navajo statements in hearings in chapter 4.

10. If a Class III archeological survey is required before mining, the lease stipulations in I-2 should provide for this and specify a 100% survey

11. Ah-shi-shipah PRLA's have been left out of the wilderness stipulation in appendix I-2. Why? Why is no maximum extraction stipulation put on leases in De Na Zin, as the wilderness EIS implied?

We recommend that BLM:

Withdraw the "Chaco-San Juan MFP Update" and replace it with a land-use plan complying with the requirements of the laws pertaining to planning for coal development, including surface owner consultation, unsuitability analysis, designation of ACEC's, identification of alternative levels of development, and protest procedures.

Issue a comprehensive EIS on the new plan and the "San Juan Basin Action Plan", discussing among other things cumulative impacts on water and Native Americans.

Discuss the competitive leases and PRLA's in a revised draft EIS (or EIS's). Such a document should include:

*A consistent and honest analysis of what production can be expected from what areas under a "no leasing" alternative.

*Final decisions on unsuitability analysis, except for those portions of tracts where stipulations "could avoid any problems which may result from subsequent application of the criterion..." (43 CFR 3461.3-1 (b) (2))

*Costs and expected environmental impacts of proposed and alternative mitigation measures for the PRLA's.

*Concrete and enforceable mitigation measures incorporated into proposed lease terms for such conflicts as occupancies, archeological and paleontological sites, and replacement of grazing and water sources.

*Site-specific differences in impacts between the various leasing and no-leasing alternatives

Rigorously review the propriety of the original exploration permits and initial showings for the PRLA's.

Make maximum use of agency discretion in setting lease terms for the PRLA's. Stipulate no strip mining or subsidence in Indian occupied areas, Wilderness Study areas, the Fossil Forest, and other areas as justified by reasonable environmental protection. Include realistic, enforceable provisions for survey and mitigation of such features as off-tract wells, undiscovered and existing paleontological and archeological sites.

Rigorously evaluate commercial quantities for the PRLA's before proceeding to decide on the need for exchanges or legislation.

Postpone the competitive lease sale until land-use planning deficiencies have been remedied, and comparisons of supply and demand in the region show that leased coal can be sold for fair market value and developed in a timely fashion. If a need for leasing were demonstrated, tracts formed from coal exchanges and from areas where preference right lease applications were improperly accepted could be offered in such a delayed sale.

APPENDIX ON PREFERENCE RIGHT LEASE APPLICATIONS

-2-

1. PRLA's

I. Our comment on the discussion of PRLA's in the first draft EIS was the following:

Prior to publication of the EIS, BLM needs to: (1) examine prior claims on PRLA land; (2) research the validity of the original prospecting permits, many, if not all of which are of questionable legality; (3) produce the promised PRLA leasing manual; (4) properly designate areas unsuitable; and (5) properly evaluate mitigation and reclamation costs.

BLM's responded to this comment at p. 4-44 of the second draft in the following manner:

(1) Prior Claims - The Bureau's position on prior claims is explained in the preamble to the December 16, 1981 proposed rules which lead to the July 30, 1982 revision to 43 CFR 3430. 2-2 (1980), 46 Federal Register 61398 (1981). The preamble explains that only prior claims of record were a bar to issuance of a prospecting permit. Since the policy of the BLM is to "rely on the assumption that individuals claiming pre-existing adverse rights will assert those rights as they see fit," 46 Federal Register 61399, no examination is needed for prior claims.

A preamble to a proposed rule is not binding law, and in fact the law in this area requires that prospecting permits which would give rise to PRLA's be issued for areas where there were no known commercial quantities of coal. If an area is known to have coal deposits it is to be competitively leased. The BLM statement that "individuals claiming pre-existing

adverse rights will assert those rights as they see fit" implies the assumption that the only time BLM would have to deny a PRLA prospecting permit based on a finding of known commercial quantities, is when the exact piece of land which is the subject of the prospecting permit application has been subjected to a prior claim. In an area with over three billion tons in-place coal this method of determining commercial quantities runs contrary to the purposes of the PRLA program. This program was established to encourage prospecting in unexplored areas, not to permit lessees to claim land adjacent to a successful mining operation without competition.

(2) Validity of Prospecting Permits - As expressed in the preamble to the July 19, 1979 regulations, 44 Federal Register 42599 (1979), the Bureau has decided to give a presumption of administrative regularity to the issuance of a prospecting permit if the file contains a finding from the Geological Survey that the "existence of workability" of the coal in the areas covered by the permit were not known when the prospecting permit was issued. Appropriate findings can be found in all San Juan PRLA files and the commentor has failed to submit any factual information which would provide any basis to look behind this presumption of administrative regularity.

A presumption of regularity does not mean that the PRLA's should be issued without question. Rather, it means that regularity is assumed until the contrary can be established. As was pointed out in our comments to the First Draft EIS, many of the original exploration permits were protested by USGS personnel based on the contention that coal was known to

59.22

A-1

A-2

59.22 exist in the Chaco area since 1885. These protests by government personnel should be sufficient to meet the presumption of regularity and prompt a review of all PRLA's.

(4) Unsuitability - Each PRLA has been fully and completely reviewed in accordance with the requirements of 43 CFR 3460 and proper stipulations have been added to the proposed lease form of each PRLA. The commentor has failed to identify any specific shortcomings in the PRLA unsuitability review and a more specific response is not possible.

(5) Properly Evaluate Mitigation and Reclamation Cost - The Bureau intends to review mitigation and reclamation cost as required by 43 CFR 3430 when it reviews the final showings of each PRLA holder. As the regulations require, each PRLA holder must show the costs of complying with lease terms as part of its final showing. There is no need for such cost information to be included in the EIS.

See discussion below re: unsuitability.

II. At p. 4-31 it is stated that there is no need to prepare a separate EIS for issuance of PRLA's. Pages 3-26 to 3-55 consider impacts of the issuance of the PRLA's. There are sufficient deficiencies with the discussion that a full EIS should be compiled prior to PRLA issuance.

1). At 3-26 it is stated that "The alternative of withdrawing these lands is not discussed because the rights of a PRLA are such that a withdrawal would have no effect on leasing since a withdrawal must be made subject to a PRLA holders valid existing rights."

The only valid existing right that a PRLA holder has is a priority if such land is leased. Under NRDC v. Berkland the

Secretary has to consider all the alternatives, including withdrawal of the lands from leasing, buying out any rights, as well as the alternatives considered in the EIS.

59.24 2) The discussion is too general, should deal with the issuance of each PRLA separately.

3) The discussion of the impacts is biased toward understatement and is totally unenlightening to the decisionmaker. The statement that "The types of impacts associated with this action would generally be the same as those identified under the No Action Alternative," tells virtually nothing about the environmental costs of this alternative, but implies that they would be minimal. However, disturbance of 22,020 acres, 1,137 paleontological sites, drawdowns of aquifers of up to 2,000 feet, and destruction of up to 713 cultural sites above any impacts of the No Action Alternative is not "generally ... the same" impact.

4) should be a more complete discussion of the PRLA subalternatives, including selective exchanges of areas of cultural, paleontological and habitat importance after surveys have been conducted.

2. New Alternatives

I. BLM asserts that the unsuitability review required by 43 C.F.R. 3461 has been conducted, although cultural, paleontological, and threatened and endangered species surveys have all been deferred until after the area has been leased and a mine plan devised.

At p. 3-8 it is stated

Expected development could destroy paleontological resources of the Late Cretaceous Crevasse Canyon, Menefee, Fruitland and Kirtland Formations. Fossils found in the Fruitland/Kirtland Formations are an important part of an almost complete biostratigraphic sequence of events which depict one of the most important episodes in evolutionary history--the transition from domination of terrestrial communities by dinosaurs to domination by mammals. Most fossils found in place in the overburden have the highest potential scientific value because they are generally far more complete and less damaged than fossils that have weathered out into alluvial plains on stream channels. Thus they provide much more valuable information about their evolution and contextual relationship with contemporary paleobiota.

Some paleontological resources in the overburden would likely be damaged or destroyed in some way by the mining process (e.g., blasting, scraping, dragline). These impacts are the most serious type that would occur to paleontological resources, and they cannot be mitigated. The construction of haul and access roads, new railroads, and surface facilities at mine sites would also destroy fossils.

At pp. 2-33 to 2-38 the rich cultural resources of this area are described. Evidence of humankind in the San Juan basin can be traced from these sites from 10,000 - 5,000 B.C. to present. At p. 3-18 it is conceded that sites or portions of sites will be lost particularly if buried sites are encountered.

The entire area should be declared temporarily unsuitable under unsuitability criteria #6.

43 C.F.R. 3461.1(f)(1) Criterion Number 6. Federal lands under permit by the surface management agency, and being used for scientific studies involving food or fiber production, natural resources, or technology demonstrations and experiments shall be considered unsuitable for the duration of the study, demonstration

59.26

or experiment, except where mining could be conducted in such a way as to enhance or not jeopardize the purposes of the study, as determined by the surface management agency, or where the principal scientific user or agency gives written concurrence to all or certain methods of mining.

Once an adequate survey is conducted then specific sites can be determined permanently unsuitable under unsuitability criteria #'s 7 and 8. The coal market is depressed and therefore, there is no urgent demand for the coal; the potential scientific resources that could be found would far outweigh short-term coal profits.

A second alternative that has to be considered is the completion of the surveys to determine unsuitability prior to the issuance of the PRLA's. A prerequisite to the issuance of a PRLA is a showing that commercial quantities of coal are present.

Until a final unsuitability determination is made it will be impossible to state what lands will be available for PRLA leasing. As a result, it will be impossible to determine how much marketable coal is on a particular PRLA. The uncertainty as to whether commercial quantities of coal exist should act as a legal bar to issuing the PRLA leases.

Responses to comment letter #59

- 59.1 In general quantitative estimates based on results of tract delineation reports prepared by the former Minerals Management Service. The number of archaeology sites was determined from existing site forms and from coal tract field inventories.
See the response to Comment 58.15.
- 59.2 See the response to comment 9.2.
- 59.2a We admit that the analysis is a possibility.
- 59.3 See the response to comment 8.4.
- 59.4 Production without new leasing is discussed in 58.14. Production levels for competitively leased tracts were based on reasonable estimates of physical capability and compliance with existing regulations. A market analysis is beyond the scope of the DEIS.
- 59.4a The text has been revised. See pages 1-6, 3-3 and 3-101. The preliminary final showing stipulations in Appendix I-2 will not necessarily be those which are ultimately applied. The competitive and PRLA stipulations will be the same.
- 59.5 See the response to 52.17.
- 59.6 The text has been revised to include wilderness-related stipulations with Bisti 1 and 2 tracts.
- 59.7 Pursuant to the Federal coal regulations, only habitat containing species on Federal or State threatened or endangered lists can be declared unsuitable for surface mining. Unsuitability criterion numbers 9 and 10 determine the lands containing habitat determined to be critical or essential for plant or animal species.
- 59.8 Both the Navajo Tribe and the BIA have indicated this Memorandum of Understanding should be abolished and rewritten. The BLM thinks the memo should be implemented as written.
- 59.9 See the response to comment 9.1.
- 59.10 See the response to comment 9.1.
- 59.11 Total Exchange or Legislation under Subalternative 2 on page 3-54 would cause all PRLA lease rights to be exchanged. Consequently, no families that presently occupy the PRLAs would have to be relocated. However, under the Exchange or Legislation for selected PRLAs alternative, the combination that was used in the text had only 14 residences affected out of a total of 55 residences on 7 PRLAs. Other combinations that were not addressed in the text could affect more or less than 55 residences.
- 59.12 BLM has the option through public involvement to determine which of the natural resources need to be protected from mining or other destructive uses through the planning process. Badlands are not uncommon in northwestern New Mexico. Representative areas were declared unsuitable, i.e., the three Wilderness Study Areas and several other areas which were set aside as potential Areas of Critical Environmental Concern. On these areas management would allow certain activities but only with strict stipulations to ensure as much protection as possible for the badlands. It would be unreasonable to declare all badlands as unsuitable.
- 59.13 Ground water quality in the San Juan Basin is highly variable. However, initial experiments by Weiler 1982 indicate that saline water from the San Juan Basin can be used for reclamation with native species that are salt tolerant.
See the response to comment 50.1.
- 59.14 See the response to comment 50.1.
- 59.15 There is no conflict of statements as to when grazing will be allowed. Page 4-129 states "Potentially some revegetated areas could be grazed or reoccupied at the end of the fifth growing season". Page 3-11 states "Vegetation will also be fenced from 6-10 years to protect new growth from grazing". The statement on page 4-129 that 20 to 40 years is the time elapsed between when an area is open to surface mining until grazing or occupancy could be resumed. The 6 to 10 year figure is from the end of mining (beginning of reclamation) to when the area could be grazed.
- 59.16 The BLM is studying the cumulative effects of pending proposals, but it is not doing so in the form of a "regional" EIS, nor is it required to do so in that form because there is no regional plan proposed. The BLM's analyses of the pending energy and wilderness-related proposals in the San Juan Basin fully comply with NEPA, including any requirements for analysis of cumulative effects described in Kleppe vs. Sierra Club, 427 U.S. 390 (1976). NEPA requires a Federal agency to consider cumulative impacts of related proposals, and to do an analysis of the impacts of a proposal for a regional plan or program. The BLM developed the San Juan Basin Action Plan as an administrative and organized approach for preparing EISs on the pending proposals. The proposals are NMWS, competitive and PRLA coal leasing, and Wilderness Study Areas. The BLM chose to study the potential environmental impacts of these pending proposals by: (1) preparing an Environmental Impact Statement on each

- 59.16 (Cont) proposal; (2) preparing a Cumulative Overview to study the cumulative effects of the proposals; and (3) by circulating the documents together to allow coordinated agency and public review. To facilitate this review, the final coal and NMGS EIS's each contain a summary of the cumulative impacts, the changes made to the Cumulative Overview as a result of comments, and the responses to comments made on the Cumulative Overview. In *Kleppe vs. Sierra Club*, 427 U.S. 390, 410 (1976), the court said that when proposals "that will have cumulative or synergistic environmental impacts upon a region are pending concurrently before an agency their, environmental consequences must be considered together." This is exactly what was done. The structure and format allow efficient use of BLM and public resources and ensure that a hard look will be taken at impacts of the pending actions which have related or connected effects. The procedures result in a full and fair look at the proposals with no intent of minimizing their cumulative effects through segmentation or separate consideration. The proposals are, as *Kleppe vs. Sierra Club* requires, being considered together. The decisions to be made on the separate actions are independent of each other.
- 59.17 The BLM is mandated by the Federal Land Policy and Management Act as you have stated to give priority to the designation and protection of Areas of Critical Environmental Concern. However, no regulatory authority has been provided at this time to require protection.
- 59.18 The purpose of the cumulative overview is to look at the combined impacts of the possible individual actions. Because the interactive cumulative impacts reach significant levels does not necessarily mean that the impacts of any single action or alternative would be significant.
- 59.19 As mentioned on page xii under General Conclusions, one of the major issues identified is the effect the proposal will have on the traditional lifestyles of nearly 22,000 Navajos living in the region. In addition, a special section on American Indian Concerns (pages 3-23, 3-51, 3-72, 3-78, 3-84) has been prepared. Also refer to pages 4-1 through 4-3. There were 18 Navajo public meetings that were conducted in the Navajo language. The BLM has printed and responded to all substantive comments from the Navajos and all other commentators.
- 59.20 See the response to comment 40.1.
- 59.21 The wilderness stipulation was included in the preliminary final showings for the three PRUAs (NM-6804, 3919, and 3918) that overlap the Ah-ehi-sie-pah WSA. They were inadvertently left out of Appendix I-2. The De-na-zin WSA did contain a no surface occupancy or subsidence stipulation. A maximum extraction stipulation would be added once a mine plan is submitted and after a mining engineer determines the mining method and extraction perimeters.
- 59.22 The BLM has examined the files to determine whether there is any validity to allegations of impropriety regarding prospecting permits. The examination showed that for each prospecting permit that was issued the file contains a final recommendation that additional exploration was needed to determine the workability of the coal in the lands sought. Under current Interior policy this alone is adequate to allow presumption of administrative regularity and in fact actual examination of the files bears this out. The files reflect that the Geological Survey normally made extensive analysis of available information before making its recommendation on whether a prospecting permit should be issued considering all relevant factors. In some cases the records do reflect differences of opinion within the Survey about whether more prospecting was needed or whether the lands should be competitively issued. Typically, these disagreements focused on how to interpret the available geological data and the degree of uncertainty about the extent and continuity of the coal deposit. The record of these disagreements is fully documented and the final recommendations reflect the resolution of the reject prospecting permit applications whether to approve or conflicting opinions. The records show that the available information was analyzed, different opinions freely aired, and disagreements resolved by officials in the Geological Survey properly charged with that duty. The record shows that in addition to a presumption of administrative regularity here, there was in fact actual regularity.
- 59.23 See the response to comment 52.20.
- 59.24 See the response to comment 52.20.
- 59.25 There are so many possible existing alternatives that it would be very difficult and speculative to address the impacts at this time. Actual determinations of specific or selected partial exchanges will occur after the Bureau receives final showings, during a review of each mine plan proposal, and after full inventory of critical resources.
- 59.26 Criteria No. 6 has been determined to mean site-specific areas where excavation or other scientific studies are occurring. It was never the intent that this criteria would result in blanket areas being declared unsuitable. Currently permits in the area are for very large geographic areas and not for specific localities. As such, no areas were determined unsuitable under Criteria No. 6.
- 59.27 Unsuitability is applied with the information that is available provided it is detailed enough to make approximate determination on the effect of a particular resource and enough so that the surface managing agent can make a "reasoned choice among the alternatives." A 100-percent inventory is not necessary at this stage of activity planning. Stipulations will be included in each lease so that provisions of the unsuitability criteria could be addressed.



60

United States Department of the Interior

NATIONAL PARK SERVICE

SOUTHWEST REGION

P.O. Box 728

Santa Fe, New Mexico 87501

IN REPLY REFER TO:

L7619(SWR-PE)

NOV 22 1983

Memorandum

To: State Director, Bureau of Land Management, Santa Fe, New Mexico
Attention: Gene Day, Project Manager

From: Associate Regional Director, Planning and Cultural Resources,
Southwest Region

Subject: Review of Bureau of Land Management Second Draft San Juan River
Regional Coal Environmental Impact Statement (DES 83/68)

Thank you for allowing the National Park Service to comment on the subject document. We appreciate the opportunity to provide our views.

Although leasing and mining will not occur within the park, the National Park Service would like to emphasize that the potential exists for impacts to Chaco Culture National Historical Park, the Chacoan outliers and the prehistoric Chacoan roads. Information associated with the extent of potential impact may not be available for analysis at this time; but this does not mitigate those potential impacts.

The National Park Service also remains, as in the past, concerned as to impacts to cultural resources. This second draft states that these concerns will be handled on a case-by-case basis. This is understandable to a point, but it is not sufficient reason to disregard the issue at this time.

The following are specific comments and proposed language changes and additions.

60.1 Page 1-2 Map 1-1 should show the locations of the Preference Right Lease Applications as well.

60.2 Page 2-3 Line 3 should be revised to read: "...the National Park Service estimates of visual range are based on actual measurements of contrast reductions made with a teleradiometer located at Chaco Culture National Historical Park. These observations indicate that the median background visual range is greater than 100 miles.

60.3 Page 2-21 Every time the term visibility appears it should be replaced with "visual range" or "visibility as measured by visual range."

60.4 Page 3-6 There should also be a table showing visual range reductions based on 24-hour particulate matter concentration estimates.

Page 3-27

60.5

There should be some explanation as to why the visual reductions for Chaco Culture National Historical Park are different from those given in the third paragraph on this page. Why aren't estimates given for Chaco Culture National Historical Park on Page 3-5 for the no-action alternative?

Page 3-27

60.6

Just because an area is rural does not justify the assertion that significant visual range reductions (56 percent) will not be appreciable. This sentence should be removed.

Page 2-3

60.7

Add after fourth line: "The National Park Service and the U.S. Environmental Protection Agency have stated (Workbook for Estimating Visibility Impairment) that visual range estimates from teleradiometer observations are more accurate than those visual range estimates on which the Trijonis work was based. In fact, the U.S. Environmental Protection Agency asserts that visual ranges given by Trijonis may be 50 percent too low. Therefore, the impacts on visual range given in the Draft Environmental Impact Statement for the reported visual range (73 miles) are significantly understated and do not represent the worst case for visual range.

Worst case analysis for visual range reduction would have required analysis of changes in particulate matter concentrations on good visibility days (i.e., above median) because it is in those conditions that the greatest reductions in visual range occur. That information was not available and has not been included in this document.

Pages 2-21
and 2-26

60.8

Figures 2-4 and 2-7 show Chaco Canyon National Monument. They should show Chaco Culture National Historical Park. (The boundaries do not represent Chaco Culture National Historical Park.)

Page 2-42

60.9

Paragraph 5 contradicts paragraph 8. Paragraph 8 has the correct information on visitation at the park.

One sentence should be added: "Chaco Culture National Historical Park was established to recognize the unique archeological resources associated with the prehistoric Chacoan culture in the San Juan Basin and to provide for the preservation and interpretation of those resources."

Page 3-36

60.10

Add to the end of paragraph 3, Visual Resources: "...where the National Park Service maintains an interpretive viewpoint to assist visitors in understanding the relationships between the resources preserved in the park and the designated Chacoan outliers (Archeological Protection Sites).

Page 3-37

60.11

Remove the final sentence in paragraph 6, Recreation, or make it crystal clear that some agency other than the National Park Service will provide such interpretation. It is not compatible with National Park Service management policies or responsibilities.

Responses to comment letter #60.

3

60.12 | Page 3-73

Give the actual numbers for visual range reductions (24-hour) at Chaco Culture National Historical Park.

60.13 | Page 3-85

Any mitigating measure relating to visibility impairment at Chaco Culture National Historical Park should be agreed to by the Regional Director, National Park Service (not the Superintendent).

Page 3-93

Other unavoidable adverse impacts of Preference Right Lease Applications issuance include:

Adverse effects to the scenic viewshed and interpretation of Chaco Culture National Historical Park's relationship to the designated Chacoan outliers.

60.14

Noise, increased traffic and industrial activity would have adverse effects on visitor experience at Chaco Culture National Historical Park and on visitors as they travel to the park.

Again, thank you for the opportunity to review and comment on the San Juan Basin projects. Your consideration of our comments and concerns is greatly appreciated. Should you have questions concerning these comments, please feel free to contact Dave Herrington, Division of Environmental Coordination, at FTS 476-6681, commercial 988-6681.

Also, we look forward to working with you on the 8th and 9th of December at the Western Bank Building in Albuquerque. The opportunity to work with the team on our concerns is appreciated.

Thomas W. Lucke
S

60.1 The text has been revised.

60.2 The text has been revised.

60.3 The term visibility is in agreement with the Clean Air Act.

60.4 The values in Table 4-8 were computed in the following manner. The National Park Service computed a visual range using telecameter measurements for the 90, 50, and 10 percentiles; these visual ranges are 160, 127, and 80 miles, respectively. As an example, this means that 90 percent of the time the visual range is 160 miles or less. Using Ursenbach's equation and the NPS computed visual ranges, a concentration was calculated to correspond to each of these visual ranges. These computed concentrations are 0.2, 7 and 22 $\mu\text{g}/\text{m}^3$ for the 160, 127 and 80 miles of visual range respectively. The 24-hour concentrations obtained by modeling were added to the above calculated concentrations to determine the total 24-hour concentrations for each alternative. Using Ursenbach's equation, the visual range corresponding to the calculated 24-hour concentration for each alternative and each of the three percentiles was calculated. The reduction and percent of reduction are shown in Table 4-8.

It should be noted that these figures are not the same as those appearing in the text. The text figure for visibility of 73 miles was computed using the NMEID measured value of 30 $\mu\text{g}/\text{m}^3$ background TSP value. The values in this table are computed as an attempt to show the impact on a 24-hour basis assuming a worst-case reduction of the NPS calculated percentile visual ranges. The intent of these calculations is to show a representative percentage reduction that may occur due to the proposed alternative developments.

60.5

The visibility was calculated using the particulate material in the air as input. The average increase was used for the basin, but the value for Chaco Culture National Historic Park was obtained from the modeling procedure and was used to compute the visibility reduction. It is assumed that visibility at Chaco Culture National Historic Park would be about the same as the surrounding basin for the No Action Alternative.

60.6 The text has been revised.

60.7 Please refer to Appendix G, page G-13 where this subject is discussed.

60.8 The text has been revised.

60.9 The text has been revised.

TABLE 4-6

POTENTIAL REDUCTIONS TO VISUAL RANGE COMPUTED FROM SELECTED
NATIONAL PARK SERVICE PERCENTILE VISUAL RANGES

Alternative	Increment (mg/m ³)	90 Percentile		50 Percentile		10 Percentile		Reduction (%)
		Visual Range (mi.)	Reduction in V.R. (mi.)	Visual Range (mi.)	Reduction in V.R. (mi.)	Visual Range (mi.)	Reduction in V.R. (mi.)	
Existing	-	160	-	127	-	80	-	-
No Action	<12.3	>107	<53	>91	<36	>68	<12	<15
PRLA	12.3	107	53	91	36	68	12	15
Bypass	13.9	103	57	88	39	66	14	18
MSOC	14.4	102	58	87	40	66	14	18
Target	14.9	101	59	86	41	65	15	18
High	15.8	98	62	84	43	64	16	20

The values in this table are computed to give an estimate of the potential impact to the visual range to a visitor. As an example, the existing visual range is 80 miles or less, 10 percent of the time. With the Target Level Alternative the visual range would be 65 miles or less, 10 percent of the time.

60.10 The text has been revised.

60.11 The text has been revised.

60.12 See the response to comment 60.4.

60.13 The text has been revised.

60.14 The text has been revised.

61

Sydney Johnson

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Golden, Colorado 80401

Reply to:

November 15, 1983

Mr. Charles W. Luscher
State Director
Bureau of Land Management
New Mexico State Office
P.O. Box 1449
Santa Fe, NM 87501

November 8, 1983

Dear Mr. Luscher:

Mr. Bill Luscher
State Director
Bureau of Land Management
P.O. Box 1449
Santa Fe, New Mexico 87501

Dear Mr. Luscher:

Please extend the time given the public for discussion of the new "Coal" Draft Environmental Impact Statement to at least twice the time now allotted.

Also, please see that meetings are held in Albuquerque, Santa Fe, and in places which are specifically arranged for the convenience of the NAVAJO TRIBE members.

Thank you!

Sydney Johnson
Sydney Johnson (M/SS)

No substantive comments in letter #61.

November 15, 1983

Mr. Charles W. Luscher
State Director
Bureau of Land Management
New Mexico State Office
P.O. Box 1449
Santa Fe, NM 87501

Dear Mr. Luscher:

The Council received a review copy of the second draft of the "San Juan River Regional Coal Environmental Impact Statement" on October 18, 1983. The BLM is to be complimented on the work undertaken thus far with respect to its consideration of historic properties in the environmental review process and in the planning for the potential leasing of coal in the San Juan Basin. We would like to offer the following observations, which should assist in compliance with Section 106 of the National Historic Preservation Act.

We note that the planning and "mitigation" measures contemplated by the BLM for historic properties mirrors the existing Programmatic Memorandum of Agreement covering the Federal coal management program. As you are no doubt aware, a heavily amended version of that Agreement is currently under consideration. BLM's planning should be flexible enough to integrate the considerations of the amended Agreement into the leasing program, if and when the amended Agreement is signed.

In addition, we recommend that the BLM adopt a planning approach that integrates the consideration of historic properties and cultural properties of importance to Native Americans into a single system. A Historic and Cultural Properties Management Plan (Plan) should be developed for the entire San Juan area covered by the EIS. This Plan should be consistent with the Council's "Treatment of Archaeological Properties: A Handbook". The development of an overall Plan will ensure full consideration is given to historic and cultural properties within the context of the resources in the region. This approach will permit rational planning by providing a optimum basis for assessing the quality of resources, the degree of impact of individual leases and the total leasing program on the total regional resource base, and will, thus, allow for better judgements on the need for, nature and degree of treatment required within each lease tract.

Council staff will be available to assist the BLM with the development of such a Plan. If you have any questions or if the Council can be of assistance, please contact Alan Downer at (303) 234-4946, an FTS number.

Sincerely,

No substantive comments in letter #62.

Louis S. Wall
for
Louis S. Wall
Chief, Western Division
of Project Review

63

Black Diamond Coal Company

12700 Park Central Place, #1404

Dallas, Texas 75251

(214) 233-3350

John D. Sawyer, Chairman
Robert T. Gray, President
Rudy Kundig, Vice President
Richard Jordan, Secretary
Donald F. Jordan, Treasurer

November 21, 1983

Mr. Charles W. Luscher
State Director
New Mexico State Office
Bureau of Land Management
P.O. Box 1449
Santa Fe, New Mexico 87510

Dear Mr. Luscher:

As the new President of Black Diamond Coal Company, I would like to provide comment on the second draft, San Juan River Regional Coal Environmental Impact Statement. Specifically, in paragraph 5, page A-48, Appendix A of the draft E. I. S. where tracts delineated by the Minerals Management Service for small business set aside are set forth.

63.1

On this list, La Plata 1, La Plata 2, La Plata 3, and La Plata 4 have been omitted and should be included as Small Business Set Aside Tracts. Please recall the correspondence between Black Diamond and the Bureau of Land Management (see attached) regarding our S. B. A. designation for these tracts.

If there is anything else required to obtain this designation, please advise us.

Sincerely,


John C. Shannon
President

Responses to comment letter #63.

63.1 The actual decision to determine which tracts will be recommended as Small Business Set Aside Tracts will be determined at the Regional Coal Team meeting to be held in the spring of 1984. Your request for La Plata 1, 2, 3, and 4 to be Small Business Set Aside Tracts will be forwarded to the Regional Coal Team.

64



United States Department of the Interior
OFFICE OF SURFACE MINING
Reclamation and Enforcement
BROOKS TOWERS
1020 15TH STREET
DENVER, COLORADO 80202

NOV 2 5 1983

MEMORANDUM

TO: Charles W. Luscher, State Director, Bureau of Land Management
(BLM), Santa Fe, New Mexico

FROM: Allen D. Klein, Administrator, Western Technical Center, Office of
Surface Mining Reclamation and Enforcement (OSM), Denver, Colorado

SUBJECT: Cooperating Agency Review and Comment--Second Draft San Juan
River Regional Coal Environmental Impact Statement (EIS)

Thank you for giving us the opportunity to review and comment on the subject EIS. This second draft is a marked improvement over the draft that we reviewed in June 1983.

We are concerned, however, that many of our previous problems with the first draft have not been resolved. In particular, our comments on cultural resources, vegetation, and wildlife do not appear to be answered in the document. I have attached a copy of our previous comments for information purposes.

We would also like to add these additional comments.

Air Quality

The discussion in chapter 3 should be expanded to reflect the results of annual average TSP concentrations found in appendix G. The annual average is a better indicator of TSP problems than the worst-case 24-hour average and would show that air-quality impacts are not as bad as the 24-hour averages indicate they may be.

64.1

Hydrology

For the most part, the material in chapters 2 and 3 is too generalized to be of much use to OSM. Probably the most useful part of the document for our use is the appendix B compilation of regional data. The U.S. Geological Survey ground-water model should be of particular value and be useful in preparing cumulative hydrologic impact assessments for individual minesites.

General

There seems to be a discrepancy between the target levels of leasing in the introductory letter and those on tables 2-3 and 2-4.

64.2

Page 3-8.--Topography cannot be destroyed. It can be altered or changed or specific topographic features can be destroyed but topography cannot.

64.3

64.4

Page 2-44.--Should the reference to NM 550 be US 550?

Pages 2-45 and 2-46.--Which roads are the county and other agency roads referred to on page 2-44? Where are the data for US 550?

The existing boundaries should be identified on the large plate in the pocket (visual E).

Once again, thank you for the opportunity to comment. If you have any further questions, please direct them to Charles M. Albrecht, Chief, Environmental Analysis Branch, Western Technical Center, (303) 837-5421.

COMMENTS ON THE SAN JUAN RIVER REGIONAL COAL DRAFT EIS

AIR QUALITY

- 64.5** The EIS should show in graphic form the predicted concentrations of TSP for 24 hours and for the annual average.
- 64.6** The EIS should include a discussion of the expected impact to the annual average TSP concentration.

CULTURAL RESOURCES

- 64.7** Page 1-34. The EIS states that there are no sites yet encountered that should be preserved in situ. However, the EIS also states that portions of some Chacoan Roads will be disturbed by the proposed action. It is OSM's opinion that Chacoan Roads have merit for in situ preservation, inasmuch as mitigation of impacts may be difficult or impossible.
- 64.8** Page 3-37. The EIS states that mining may destroy a portion of Pierre's Ruin. This site is eligible for in situ preservation on the basis that mitigation of impacts would be difficult or impossible.
- 64.9** Page 3-51. The EIS should include a discussion of data recovery at eligible sites or possible mitigation measures to be used for the Chacoan Roads. Proposed mitigation measures should adequately mitigate impacts in order to lessen or eliminate those impacts.
- 64.10** Page 3-51. Blasting studies concerning impacts to cultural resources should be completed prior to the final EIS so that these important data can be taken into account in the final EIS and in final lease tract determinations. Completion of these studies just prior to lease issuance is too late in the process to be useful in the selection process. Early information could be used to eliminate areas from leasing which, if leased, could later be determined as unsuitable for mining.

Page 4-6. The Advisory Council on Historic Preservation should be included as a document recipient pursuant to the Secretary's Section 106 responsibilities.

SOCIOECONOMICS

- 64.11** Page 2-37. It would be helpful to specifically define what counties/communities were included in the socioeconomic assessment. Reasons for not including certain communities within the region (i.e., Shiprock, Gallup) should be stated.
- 64.12** Page 2-46. It would be useful to include a discussion of current Navajo demographic trends (i.e., in- and out-reservation migration, shifting population within the reservation) as it relates to increased jobs and energy development. The potential for existing trends to change or continue as a result of increased coal development should be acknowledged in Chapter 3.
- 64.13** Page 3-4. The following text change is suggested: "Increases in annual growth rates of less than 10 percent may cause considerable change within a community; however, growth rates in excess of 10 percent are considered to cause major adverse impacts. Therefore, those communities experiencing an annual growth rate in excess of 10 percent are the focus of this EIS." Several sources indicated that a 5 percent annual growth rate is tolerable, 7-10 percent results in the "boomtown" phenomenon, and an excess of 10-15 percent causes severe institutional breakdowns (EPA 600-9-77-033) (Gilmore, 1976).
- 64.14** Page 3-24. It would be useful if BLM would include more definitive data on the population impacts of the preferred alternative. This data should be arranged by year and community. A discussion of assumptions used in forecasting the population figures (p. 3-24) could be included in the appendix. This discussion should include (a) an identification of projects included in the baseline and "with Target Level" forecasts, (b) an overview of any particular economic/demographic models used in BLM's population forecasting, and (c) the assumptions used to calculate Native American opportunities (p. 3-24) associated with increased coal leasing.

Page 3-53. Although BLM's assessment concludes that there is potential for significant socioeconomic impacts in certain communities (i.e., Cuba, Milan, Crownpoint), there is no discussion of impact mitigation options. It would be helpful to include a discussion of mitigation measures in accordance with CEQ regulations 40 CFR 1502.14, the Mineral Leasing Act, Section 30, and implementing regulations of FLMPLA. It is suggested that the New Mexico State BLM Office include the attached stipulations on the PRLA's considered in the DEIS. This stipulation is applied to all PRLA's within the Colorado Green River-Hams Fork Region and would also be appropriate in the San Juan River Region.

64.15

VEGETATION

The EIS should include acreage figures for individual mapping units of both the soil associations and the vegetative types for the region (recognizing they are approximations). Preparation of the estimates of the total AUM's that will be lost is of considerable importance in evaluating the total impact on regional agriculture. Comparison of the loss in total AUM's that the land now supports is important and should be added. The assumptions for livestock use of the reclaimed sites (the length of time prior to instituting utilization, seasonality of use compared to the pre-mine site, etc.) should also be stated.

64.16

Page 2-15. "Sandy soils can be added to saline-sodic soils to change the salt/sodium exchange levels through mixing and layering." The reasoning or suggestion is not valid in that huge quantities of sandy soil would be required to dilute the exchange complex of clayey sodic soil types. The additional requirement for relatively complete mixing of the two materials makes the task even more difficult to accomplish. Also, the sand and loamy sand soils have very limited water-holding capacities, cation-exchange capacities, and nutrient pools, which are, in themselves, serious limitations to plant growth.

64.17

Page 2-15. " * * * reclamation may be limited for some of the tracts because of soil characteristics found within certain land types. The amount of these soil types and their limitations for reclamation will not be fully known until soil surveys are conducted on the competitive coal lease tracts and reclamation plans submitted and implemented by companies." The analysis must provide some

64.18

indication of the reclamation potential for the area. This can be accomplished by identifying the dominant soil series from the existing soil inventory work, obtaining SCS form 5's with interpretations for topsoil material and other uses required in surface mining. Develop some approximation of the areal extent from the existing soil association maps. Obtain the existing analytical data for the series from all sources. Using one or more of the series of the interpretative guidelines for the use of soil materials in the reclamation of drastically disturbed land (National Soils Handbook, EMRIA, SEAM, Schafer, etc.), identify those units which have high, medium, or no potential for use in reclamation. Coupled with some approximate acreages drawn from the soil association maps, the reader could thus gain some idea as to the extent and types of reclamation problems that exist in the region.

64.18

Page 2-25. " * * * the BLM has no knowledge of actual livestock operators, livestock numbers, class of livestock, or range developments." The lack of information again makes thoughtful interpretation of the resource data and the potential for mitigation very difficult. Was the BIA consulted or directly involved during the preparation of the EIS? Of the potential regional impact, a considerable amount will be borne by the Native American populations, although little or no information is available on their use(s) of the land.

64.19

Page 2-24. "Many operators reside on or near the allotment(s) their livestock graze, and herd their livestock to and from their dwellings daily." How will the operators utilizing this type of livestock management system survive during the mining operation? Will the resulting post-mine ecosystem have the required components and stability to support this type of management or utilization? In the event of collapse of reclaimed vegetation post-bond release, how will surface owners/operators survive?

64.20

What is the basis for determination of the suitability of the soil or overburden materials for the reclamation of drastically disturbed land. Several such guidelines exist in State regulatory guidelines for the reclamation of surface mined coal and others have been prepared for wider use (National Soils Handbook (SCS), EMRIA (rev.), SEAM, Schafer, etc.) To generalize and say that the area has a low to moderate reclamation potential is not satisfactory.

64.21

Relatively large amounts of regional geochemical data are available. Sources include EMRIA reports developed by the BLM, USGS Professional Papers, mine plans, literature, etc. The potential for the development of toxic substrates in the plant rooting zone must be addressed, particularly when such data are available. What are the dominant limitations in the overburden/soil chemical environment which influence reclamation success? Are there any potential biogeochemical problems which could influence livestock thriftiness, such as Cu/Mo deficiencies, toxicities, or aberrations of their normal ratios?

64.22

The EIS suggests in several sections that revegetation can be accomplished. Evidence should be cited that such efforts have been attained on similar or related soils and precipitation zones. What data are available to suggest that the product of the revegetation effort is " * * a diverse, effective, and permanent vegetative cover of the same seasonal variety native to the area * * * (30 CFR 816.111)? Several references NAS Soil, Coal and Society cast doubt on the long-term success without continued input of amendments or supplemental moisture by man.

64.23

WILDLIFE

OSM feels that the discussions and assessments regarding fish and wildlife resources of the region are too brief and often incomplete. Since this action will affect a minimum of 70,800 acres, we believe that impacts on fish and wildlife resources deserve a more thorough and reasonable treatment in the EIS. Specific comments follow.

64.24

Chapter 2 should include a description of the various wildlife habitats present in the region. Often these overlap with plant community descriptions but usually include special habitat features, such as riparian zones, rock outcrops, cliffs, stock ponds, etc. Also, the special value of these habitats as wintering or breeding grounds and stop-over locations for migratory species should be discussed.

64.25

Page 2-25. The EIS states that no habitat for threatened and endangered species has been identified. This statement omits the habitats foraged by wintering bald eagles. This impact should be acknowledged or contrary information should be supplied.

64.26

Pages 3-12 through 3-14. The impact discussion is confined to species of high Federal interest. This section should be expanded to include impacts on the entire wildlife community of the region. This same suggestion applies to the statements on page 3-42.

64.27

Page 3-51. The mitigating measures presented are incomplete. It would be helpful to describe the numerous mitigation measures that could apply to these operations which would minimize impacts on wildlife. Some of these would be:

- o Habitat restoration.
- o Employee education to reduce harassment and poaching.
- o Speed limits to reduce road kills.
- o Proper powerline design to avoid raptor electrocution.
- o Buffer zones around raptor nests where appropriate.
- o Improving water availability and protecting such sources from livestock abuse.
- o Revegetation plans utilizing wildlife food and cover plants.

64.28

The discussion of unavoidable impacts is incomplete. Such a discussion should include all of the indirect impacts on wildlife resulting from increased human activity and the additional loss of habitat due to housing and service facility construction.

64.29

Page 3-69. There appears to be a wording error in the second paragraph where it is stated that no raptor "meeting" sites would be removed. Should this term be "nesting"?

64.30

Responses to comment letter #64.

- 64.1 An EIS should consider the worst-case for analysis. The use of worst-case was intended to show the potential to exceed ambient standards. The use of annual average may not show the potential to exceed the ambient standards.
- 64.2 The target levels of leasing in the introductory letter are for the Preferred Alternative whereas those in Tables 2-3 and 2-4 are for the Target Alternative and High Alternative, respectively.
- 64.3 The text has been revised.
- 64.4 County and other agency roads are described in detail in Appendices E-4 and E-5. On page 2-44, the text has been revised to reflect USFSO. No additional information was provided on USFSO because it is expected that the majority of the coal will be transported in a southerly direction out of the San Juan Basin. As a result, all anticipated impacts to USFSO were judged to be less than 10 percent, or below the level of significance.
- 64.5 Table 3-1 shows the estimated 24-hour TSP concentrations for each alternative. The annual values are listed in the text for the various alternatives.
- 64.6 Each alternative discusses the expected increase in TSP, and compares the projected increases to the ambient standards.
- 64.7 Page 1-21 (Table 1-5) of the Second Draft San Juan River Regional Coal EIS states that 520 acres have been found unsuitable. This encompasses three sites: Bisti 1, and 18th century battlefield, Crownpoint NE a Chacoan shrine and an Anasazi Basketmaker III through early pueblo 1 pitthouse village. Within the area found unsuitable for the pitthouse village are several segments of the prehistoric South Road (see page A-83 for further information). The segments of a prehistoric road within the Nageezi tract are protected by adequate mitigation stipulations. These segments along with the ones in Crownpoint Northeast and Lee Ranch East are the only known Chaco road segments located on competitive tracts. These findings were determined in consultation with BIA and the State Historic Preservation Officer and will be considered in the mitigation plan which will be prepared before mine plan approval. The findings of the Chaco Road study recently published by ELM will be considered in this mitigation plan.
- 64.8 Pierre: Ruin, as defined in PL 96-550, has been excluded from the lease tract. The majority of the community is within this 440 acres. Several small community sites are known to occur to the north of the protection site. These sites will be protected through approval of a mitigation plan prior to mine plan approval. See page 3-87 for special mitigation measures for Pierre's Ruin Community.

- 64.9 Refer to comment 64.7. A Chaco road study was recently published by ELM; this study outlines mitigation procedures for the Chaco roads. The results of this study will be considered when the mitigation plan is developed at mine plan.
- 64.10 Blasting studies have been conducted by the Santa Fe Industries, and is being conducted by USFS for NPS; however, the USIS/AFS study will be published after the release of the Final EIS. In delineating the lease tracts, known cultural site types and density were considered and the tracts configured accordingly. Only when a site-specific mine plan is submitted by the lease operator along with a detailed site-specific cultural survey will any specific blast mitigating measures be developed.
- 64.11 A population growth rate of 10 percent or more was considered significant and likely to result in impacts that need to be given consideration. There were no areas within the reservation that had the potential to receive this level of impact; therefore, migration into and out of the reservation were not analyzed. Gallup was considered in the initial analysis but significant levels of impacts were not identified. Population changes are shown in Table 3-20 for communities where changes were significant. This data is by community for the years 1987 and 2000. The 1987 figures show the initial effects of coal production and the year 2000 is the year within a reasonable projection period (15 to 20 years) at which projected production levels off. The baseline projects are discussed on page 1-4 of the document. The economic and demographic data were calculated by hand starting with projected employment for designated levels of production. The increase in population was distributed to communities by community size, services and distance to coal reserves. The assumptions relating to Indian employment are that they would have opportunity to apply for direct and indirect jobs based on their experience, qualifications and desire to be employed.
- 64.12 See the response to comment 64.11.
- 64.13 See the response to comment 64.11.
- 64.14 See the response to comment 64.11.
- 64.15 See the responses to comments 21.2 and 27.1 for socio-economic mitigation measures. Additional Special Stipulations, by PHIA are in Appendix I-2.
- 64.16 Refer to the Chaco-San Juan Planning Unit Resource Analysis - Update for Coal (USDI, ELM 1986) for vegetation type maps of the region. Estimates on total ANM losses and comparisons to the region are included in Table 3-4.

- 64.16 Assumptions for livestock use of reclaimed sites would be premature; (cont) therefore, they are not included in this EIS.
- 64.17 The statement is correct, based on principles of soil science, and experience in the San Juan Basin using sandy soils and selected sandstone overburden as a revegetation medium. See: Richardson, Gary L., 1982. Use of overburden materials for revegetation. In: Reclamation of Mined Lands in the Southwest, A symposium, Earl P. Aldon and Wendell R. Oaks ed. October 20-22, 1982 Pub. SSCA - New Mexico Chapter. Also See: New Mexico Energy and Minerals Department 1982. Findings of Fact, Conclusions of Law Surface. Coal Mining Permit No. 20-2P. Farmington, New Mexico.
- 64.18 Detailed information for each tract, including intensive soil surveys for reclamation, is developed at the Mine and Reclamation Plan stage. The Environmental Analysis prepared for each tract by OSM will include reclamation potentials and problems.
- 64.19 The statement on page 2-25 of the first DEIS was revised in the Second Draft San Juan River Regional Coal EIS. Also refer to Chapter 4, regarding BIA involvement in preparation of the EIS.
- 64.20 Additional environmental analysis would be required on a mine plan to identify and analyze site-specific grazing impacts projected to occur from lease development. Most individuals utilizing the type of livestock management system you mentioned would 1) have to temporarily relocate both themselves and their livestock, or 2) change their style of livestock management (corral them and provide feed or graze them at a separate location). This would apply to only surface mineable tracts.
- 64.21 Suitability of soil, as a source of topsoil, for reclamation was based on information in published Soil Surveys and USDA-SCS "Guide for Interpreting Engineering Uses of Soils", November 1971. Overburden material will be examined during the Reclamation and Mine Plan process.
- 64.22 Regional geochemical data sources, such as EMRIA reports, indicate salinity as a potential toxicity problem and the need for additional drilling to identify potential toxicity problems on each tract. Salinity has been discussed in the DEIS. The Reclamation and Mine Plan must identify such potential problems and their solutions as defined in OSM regulation 780.18(f), Federal Register Vol. 44, No. 50. Potential toxicity problems would also be addressed in OSM's Environmental Analysis for each tract.
- 64.23 See the response to comment 32.1.
- 64.24 As pointed out in the Second Draft San Juan River Regional Coal EIS on page 3-17, all wildlife species and their habitats were analyzed and the impacts to these species were not determined to be major.
- 64.25 Special habitat features are restricted in the Chaco portion of the EIS area. There are approximately four stock tanks that hold some water and approximately three that don't. Some have trees associated with them. While these special habitat features have local value to migrants, their significance in the EIS region is considered very limited.
- 64.26 The only known bald eagle use areas in the EIS region are discussed on page 2-33.
- 64.27 As indicated on page 3-17 the wildlife impact discussions are restricted to those that are major. However, as pointed out on page 3-17 all wildlife species and their habitats were analyzed.
- 64.28 Much of the mitigation mentioned will be addressed in the mine plan. However, the specific items mentioned are either identified or implied in the discussions on pages 1-19 or 3-87.
- The EIM has and normally requires adherence to standardized raptor specification power lines where it has authority to do so.
- 64.29 Harassment and shooting, and loss of habitat encompass the major indirect impacts to wildlife. This includes harassment during nesting season to the point of abandonment. There is an added loss of habitat from mining and related construction activities.
- 64.30 While this wording error could not be found on page 3-69, the comment is correct.

65

No substantive comments in letter #65.

943e
a10
Dane Day
Box 36
Fruitland, New Mexico
87416

U.S. Bureau of Land Mgn.
New Mexico State Office
P.O. Box 1449
Santa Fe, New Mexico.

Dear Sirs:

The new leasing target of 800 to 900 million tons of coal to me is not needed at this time. We now have more coal leased than there are demands for it.

I'm sure that a number of the new bid leases (if carried out) will go to a number of firms that already hold leases on other tracts.

At the present any strip mining leaves the land open, and to vegetate as of today will not rehabilitate the land back to present level of vegetation.

We have trillions and trillions of cubic feet of natural gas. I doubt if any one really knows how much gas we do have. Maybe we should use the gas instead of coal.

Yours truly,

Vernon Moore

Vernon Moore

66

ARCH MINERAL CORPORATION

200 NORTH BROADWAY
ST. LOUIS, MISSOURI 63102TSL:JWS/MS
(10/11/83) 10/11/83M E M O R A N D U M

TO: Gene Day
New Mexico Bureau of Land Management

FROM: Sheridan A. Glen

SUBJECT: Comments on San Juan Regional Coal Environmental Impact Statement
Second Draft, October, 1983. DATE: 12/1/83

Arch Mineral Corporation and Ark Land Co. have reviewed the draft San Juan Regional Coal Environmental Impact Statement, released to the public on September 12, 1983.

We understand that this document was revised in order to study and consider non-competitive leasing as a separate alternative and the BLM studied new alternatives such as exchanging lands in order to protect various areas. Since several of the Ark Land preference right lease applications fall within the Ah-she-sie-pah Wilderness Study Area we realize that no lease issuance will be forthcoming on those areas until congress determines the fate of the study area. This company has previously gone on record as agreeing with the BLM that the Ah-she-sie-pah should not go forward as a wilderness area. We do however, realize that this is a sensitive issue and have, in the past, requested that the adjudication procedures for the preference right lease application covered by this Wilderness Study Area be held in abeyance until a final decision is made. However, we do not support exchanging PRLA's within the Ah-she-sie-pah wilderness study area until such time that Congress has made its decision regarding this area's future delineation. For the purposes of meeting the requirements of its final showing, Ark Land has included the coal underlying the Ah-she-sie-pah Wilderness Study Area in the determination of its showing of commercial quantities. If Congress reacts favorably to the BLM recommendation that this area not go forward as wilderness, then we expect these preference right lease applications to be processed and issued if all other criteria met.

On page XIV of the draft Environmental Impact Statement the BLM states the preferred action is the issuance of all 26 PRLA's "with the currently proposed lease terms or conditions." However, on various pages of Section 3 the document describes additional and possibly onerous lease terms which allege to reduce adverse affects of converting the PRLA's to leases. If additional lease stipulations are brought forward as a result of the approval of this document, Ark Land is concerned that new or additional showings might possibly have to be made incorporating these new lease stipulations. If it is the opinion of the BLM that additional and tougher lease stipulations are necessary in the areas to be leased by Ark Land Company and others, we feel that they should be mitigated or their impact determined during the permit

Gene Day
Page 2
December 1, 1983

development stage rather than the lease stage, since the final showing material for each of the Ark Land PRLA's has already been submitted. Some of the additional stipulations relatively innocuous and would have no impact on the Ark Land PRLA's. However, we oppose any subsequent submissions to the completed and submitted final showings which would alter the calculations of meeting the commercial quantity requirements.

The BLM is to be commended for its comprehensive and tireless efforts in the development of this document. We trust that this will expedite the adjudication and issuance of these PRLA's for which Ark Land and other companies have been waiting and planning for well over a decade.

Sincerely,

ARCH MINERAL CORPORATION

Sheridan A. Glen
Assistant Vice President

SAG/vls

No substantive comments in letter #66

67



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
Washington, D.C. 20230

OFFICE OF THE ADMINISTRATOR

November 21, 1983

Mr. Charles W. Luscher
Bureau of Land Management
New Mexico State Office
Box 1449
Santa Fe, N.M. 87501

Dear Sir:

This is in reference to your draft environmental impact statement for the San Juan River Coal Project in the Farmington Resource Area. Enclosed are the comments of the National Oceanic and Atmospheric Administration.

Thank you for giving us an opportunity to provide comments which we hope will be of assistance to you. We would appreciate receiving two copies of the final environmental impact statement.

Sincerely,

David Coffey
for

Joyce M. Wood
Chief
Ecology and Conservation Division

Enclosure



U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
ENVIRONMENTAL RESEARCH LABORATORIES
Boulder, Colorado 80303

November 14, 1983

R/EI:REP

TO: PP2 - Joyce Wood
FROM: R/EI - Joseph H. Golden

SUBJECT: Comments on DEIS #8310.08 - Second Draft San Juan River Coal EIS,
Farmington Resource Area - Bureau of Land Management.

The EIS has some serious shortcomings in its assessment of total suspended particulates (TSP) as reflected in numerous statements in the Air Quality sections. Specific examples follow.

67.0

Particle size, mass, and distance of travel

- 1) "...the relatively short distance TSP will travel from mining operations (generally less than 20 kilometers)..." p.2-2.
- 2) "...only 17% of the initial emissions would remain in suspension at 10 km downwind." p.4-28.
- 3) "Most of the particles...are large and would settle out within approximately one mile of the source." p.3-5.
- 4) "...as seen in Appendix G, the TSP concentrations are limited in spatial extent..." p.3-27.
- 5) "...the mass median diameter of particulates is in the range of 10-35 microns...it is not expected that a significant fraction of the generated particulate matter would be sub-micron in size..." p.4-20.
- 6) "The region generally experiences a deep air mixing level, which disperses pollutants."

Visibility, and particle number (vs. mass) concentrations

- 7) "Short-term (24-hour) concentrations would result in a reduction of visual range to 32 miles [from 73 miles], a decrease of 56 percent. Because of the rural nature of the area it is not expected that the loss in visibility would be appreciable." p.3-27 and p.4-22.
- 8) Average annual "cumulative" visual range reductions given in table 3-1a are 60 miles or somewhat more.



The TSP dispersion model

- 67.0**
- 9) "Modifications were made in the CDMQC model to consider rural air quality conditions". p.4-24. **67.2**
 - 10) "The CDMQC model...was not modified for use in a rural scenario..." p.6-5.
 - 11) "...annual average concentrations are accurate within a factor of two. Its [the model's] predictions of 24-hour impacts may be less accurate..." p.6-5. **67.3**

Monitoring

"...post-construction monitoring... could identify the occurrence of impairment and the source of the problem."

67.4

67.5

Comments

First, it is not made obviously clear in the EIS that all particle calculations are based on mass of the TSP and not on numbers (concentrations) of the particles. Any size distribution of particles generated as a result of the mining operations will carry orders of magnitude more small particles than large ones (in number per unit volume of air).

67.1

The larger particles will settle out first, because they are heavier, and indeed, most of the mass of the TSP will eventually be removed by this size sorting process. We contend (re: Statements # 1-6) that particles as large as 10-35 microns may be carried by the wind for a thousand kilometers or more. (See, e.g., Desert Dust: Origin, Characteristics, and Effects on Man. Special paper 186, p. 96, Geological Society of America, Boulder, CO.) Furthermore, this transport is most likely when the particles are mixed through a deep air layer, as is claimed to be the case in the area under study. Thus, the statements on transport and mixing depth are in conflict. Statement #3 ("Most...") is hardly a quantitative statement and is absolutely untrue if it refers to the number concentration of particles. Statement #1 is untrue as written: "TSP" = Total (i.e., all) suspended particulates will not generally settle out in less than 20 kilometers distance.

If "only 17% of the mass of initial emissions indeed would remain in suspension beyond 10 km (Statement #2), this could indicate that 80 or 90% of the total number of particles, of some 0.1-10 micron diameter, will still be suspended in the air beyond 10 km. These smaller, less-heavy particles are the ones that impact visual range and human respiration.

Respiration problems from the windblown dust of the Southwestern U.S. is real (see, e.g., attached paper, "Dust Storms Due to the Dessication of Owens Lake"). This impact has not been addressed in the EIS.

Regarding visibility, the differentiation between particle size and mass, and the much longer-range transport of the smaller particles should be elucidated throughout the EIS. Statement #7 is astounding, in that it says that a reduction in visibility by 56 percent (i.e., to less than half the original visual range) is not appreciable.

What is meant by "cumulative" visual reductions of average annual visual range given in Table 3-1a, and what are the "cumulative" 24-hour visual reductions?

Statements #9 and #10, on the model used to estimate dispersion, are opposites; both cannot be true.

No model can be perfectly accurate, but the range of uncertainty in the model (Statement #11) needs to be expressed in terms of the statement on TSP and visibility throughout the document to provide an objective EIS.

Finally, any pertinent monitoring of particulates should be conducted before as well as after development to provide objective comparisons and assessment of effects.

Thank you for the opportunity to review this draft EIS. We hope the above comments are useful. If there are questions regarding the review, please contact Dr. Roger F. Reinking of this office (FIS 320-6212).

Attachment

68



DEPARTMENT OF THE AIR FORCE
AIR FORCE REGIONAL CIVIL ENGINEER CENTRAL REGION (HAFSC)
1114 COMMERCE STREET
DALLAS, TEXAS 75242

15 December 1983

ROV

San Juan River Coal Region Environmental Impact Statement (EIS) - Second Draft

Mr. Lee V. Larson
BLM, Farmington Resource Area
900 N. LaPlata Highway
Caller Service 4104
Farmington, NM 97401

1. We have received the referenced EIS and find it a very well prepared, and comprehensive document.
2. Our review indicates San Juan River Coal Region does not include any New Mexico counties which contain Air Force installations. We wish, however, to maintain general interest in BLM coal development activities in New Mexico in the event future development takes place in the proximity of Air Force property.
3. Thank you for the opportunity to review the EIS. For any additional information, please call Mr. Tony Robledo at 214-767-2514 (FTS 8-729-2514).

JOE C. LAROF, JR., Lt. Col., USAF
Chief, Environmental Planning Division

Responses to comment letter #67.

- 67.0 Because the commentor has not provided the specific short comings we are unable to respond to the comment.
- 67.1 The impacts were modeled to obtain a predicted concentration of particulates that could be compared to the ambient standards. The standards are in Mg/M^3 . Studies done on coal mine emissions for EPA indicate that the majority of particles emitted due to mining operations are greater than 10 micron in diameter. Particles of this size settle relatively fast. The isopleth maps shown in Appendix G show the modeled concentrations (Anderson 1978).
- 67.2 The reduction mentioned is using the annual average of 73 miles and the TSP value for 24 hours. This reduction would be over small areas as shown in the isopleth maps in Appendix G.
- 67.3 This is what the 73-mile visibility would be reduced to for the various alternatives.
- 67.4 Appendix G has been revised to say the model was modified.
- 67.5 The CDMQC model does not predict visibility. The model values were used to assess the impacts, based on the assumed worst case. Due to the paucity of significant impacts, the lower range was not included in the analysis.
- 67.6 Monitoring may be required by the permitting authority at the PSD or operation stage. Modeling is the method used to analyze impacts at the EIS stage.

LIST OF PREPARERS

Name	Assignment	Report Writers/Reviewers	
		Education	Experience
Lee Larson	Team Leader, Technical Coordinator	BS Forestry/Recreation	BLM - 2 years - Natural Resource Specialist; 3 years - Outdoor Recreation Planner, 2 ¹ / ₂ years Supervisor Planning and Environmental Coordinator
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Name	Experience (BLM)	Name	Experience (BLM)
Esther S. Willetto	2 years Range Clerk	Jeffery S. Nighbert	5 yrs. District Cartographer
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Irene Rivera	2 ¹ / ₂ year Clerk-Typist		

APPENDICES

APPENDIX A

BACKGROUND INFORMATION

APPENDIX A-1

TRACT SUMMARIES

LA PLATA #1 TRACT FEDERAL OWNERSHIP - SURFACE MINE

The La Plata #1 Tract, approximately 200 acres in size, is located 15 miles north of Farmington, New Mexico. Land surface and coal within the tract are federally owned. The tract total and unleased coal is an estimated 8.8 million tons of mineable reserves and 7.5 million tons of recoverable reserves. The expected peak production rate would be 1.5 million tons per year for a projected mine life of 7 years. Total expected revenue from federal coal within the tract is \$150 million with an expected federal royalty value of \$18.8 million for the life of the mine. Approximately 40 surface acres would be disturbed annually. Surface disturbance over the life of the mine would total 200 acres.

Approximately 112 employees would be needed to mine the reserves. The mining activities would require approximately 30 acre feet/year of water from deep wells for mining operations.

Surface disturbance on the acreage of each tract would increase erosion, soil contamination, changing soil characteristics and possible loss or destruction of suitable soils which may occur during overburden removal, stockpiling, and reclamation. The hydrological resource impacts include destruction of stratified nature of Fruitland formation overburden and all confining layers above the Pictured Cliffs Sandstone. These would be replaced with crumbled shale and sandstone rubble having a greater porosity than the original stratified material. This may result in upward leakage from the underlying Pictured Cliffs Sandstone which contains water of a much greater salinity. There is also a possibility of changes in water quality in wells and lowering of water levels in wells tapping the same aquifers in vicinity of the tract.

Paleontological resources show no significant impacts. Total acreage disturbed on the paleontological resources would be 250 acres.

The impacts to the range resources would be the loss of 19 AUM's of forage over the life of the mine and the destruction of one stock reservoir.

LA PLATA #2 TRACT FEDERAL OWNERSHIP - UNDERGROUND MINE

The La Plata #2 Tract, approximately 200 acres in size, is located 15 miles north of Farmington, New Mexico. Land surface and coal within the tract are federally owned. The tract total and unleased coal is an estimated 12.0 million tons of mineable reserves and 2.0 million tons of recoverable

reserves. The expected production rate would be .50 million tons per year for a projected mine life of 7 years. Total expected revenue from federal coal within the tract is \$52.5 million with an expected federal royalty value of \$4.2 million for the life of the mine. A maximum of 80 surface acres would be disturbed over the life of the underground mine for placement of the related surface facilities.

Approximately 125 employees would be needed to mine the reserves. The mining activities would require approximately 40 acre feet/year from deep wells for mining operations.

Impacts from ground water include seepage of water from the underlying Pictured Cliffs Sandstone into the mine which might effect yield and water levels in wells. Subsidence might disrupt overlying bedrock aquifers in the Fruitland formation by fracturing them and affect potential ground water supplies from that aquifer.

The range resource impacts would include the loss of 8 AUM's of forage for the life of the mine on the surface facilities.

The impacts to cultural resources would be one Anasazi site and a portion of another, LA 5605. The LA 5605 site consists of a 500 foot by 3,500 foot habitation site and is also located in La Plata Tract #4. These sites may be destroyed by surface activities associated with the underground mining.

STAR LAKE WEST #2 TRACT
MIXED OWNERSHIP - SURFACE MINE

The Star Lake West #2 Tract, approximately 760 acres in size, is located 30 miles west of Cuba, New Mexico. Of the total 760 acres for land surface 440 acres are unleased Federal, and 320 acres are State. The acreage for the coal reserves is 760 acres unleased Federal.

The tract contains mineable reserves of unleased Federal at 28.0 million tons with the tract total of 28.0 million tons. The recoverable reserves tonnage of unleased Federal is 24.0 million tons with the tract total of 24.0 million tons. The expected peak production rate would be 2.0 million tons per year for a projected mine life of 14 years. Total expected revenue from federal coal within the tract is \$470 million with an expected federal royalty value of \$58.8 million for the life of the mine. Approximately 65 surface acres would be disturbed annually. Surface disturbance over the life of the mine would total 760 acres.

Approximately 150 employees would be needed to mine the reserves. The mining activities would require approximately 65 acre feet/year of water from deep wells for reclamation and dust control.

Surface disturbance on this tract would increase erosion, soil contamination, changing soil characteristics and possible loss or destruction of suitable soils which may occur during overburden removal, stockpiling and

reclamation. The hydrological resource impacts include destruction of stratified nature of Fruitland formation overburden and all confining layers above the Pictured Cliffs Sandstone. These would be replaced with crumbled shale and sandstone rubble having a greater porosity than the original stratified material. This may result in upward leakage of water from the underlying Pictured Cliffs Sandstone which may contain water of a much greater salinity than the water in the fruitland formation. Possible offsite reduction of well yields, lowering of water levels, and changes in water quality in wells. Withdrawal of ground water from deep aquifers for reclamation and dust suppression would alter ground water flow near the wells and may cause a lowering of water levels in wells tapping the same aquifers in vicinity of the tract.

Surface Water impacts include the following:

- a. Runoff from mined area would be impounded, resulting in an unknown but probably small amount of surface water lost to evaporation.
- b. Increase in dissolved and suspended solids concentrations in runoff during reclamation phase until channels stabilize. This area requires special attention during the mining and reclamation phases because a major tributary to Chaco Wash, Arroyo Pueblo Alto, drains the area.
- c. Use of saline or sodic ground water from "deep" aquifers may impact water quality of runoff from reclaimed areas.
- d. 16 acres of floodplain on Arroyo Pueblo Alto in T. 20 N., R. 6 W., Section 18 would be disrupted.

The loss of approximately 58 AUM's of native forage over the life of the mine would occur.

The visual resources in this tract are in Class III management area and surface mining would not meet the management objectives for this classification.

Paleontological resource impacts for this tract reveal no fossil localities recorded. However, potential for subsurface fossils contained in the overburden is high. Although high probability exists for the destruction of any megafossils and associative data, the microfossil, invertebrate and botanical material could still retain a certain degree of scientific and educational utility. The estimated fossil localities disturbed in the first year would be 10. The total acres disturbed is 760. While the estimated total number of fossil localities disturbed is 51.

Cultural resource impacts indicate that two isolated localities have been recorded. Sites in the tract would be destroyed by mining activities.

As for any recreation impacts, surface mining activities on Star Lake West #2 could disrupt the Continental Divide National Scenic Trail location.

KIMBETO #1 TRACT
MIXED OWNERSHIP - UNDERGROUND MINE

The Kimbeto #1 Tract, approximately 3,680 acres in size, is located 1 to 3 miles south of the settlement of Kimbeto and/or 45 miles southeast of Farmington, New Mexico. Of the total 3,680 acres for land surface 2,240 acres are unleased Federal, and 1,440 acres are private. The acreages for the coal reserves are 3,360 acres unleased Federal, and 320 acres for private.

The tract contains mineable reserves of unleased Federal at 75.7 million tons with the tract total of 825 million tons. The recoverable reserves tonnage of unleased Federal is 38 million tons with the tract total of 41 million tons. The expected production rate would be 1.1 million tons per year for a projected mine life of 37 years. Total expected revenue from federal coal within the tract is \$948 million with an expected federal royalty value of \$75.8 million for the life of the mine. A maximum of 80 surface acres would be disturbed over the life of the underground mine for placement of the related surface facilities.

Approximately 275 employees would be needed to mine the reserves. The mining activities would require approximately 23 million gallons of water per year from deep wells for mining operations.

Impacts on ground water from deep aquifer(s) for dust suppression and reclamation would alter ground-water flow near the well(s) and may cause a lowering of water levels in wells tapping the same aquifer(s) in the vicinity of tract. Subsidence may disrupt overlying bedrock aquifer(s) in the Fruitland formation by fracturing them. This may affect well yields, water levels and possible water quality in wells tapping those aquifers. Two wells exist within this tract. The quantity or quality of water available to these wells may be affected by subsidence and/or mine dewatering.

Paleontological resource impacts show three recorded sites within the boundaries of the tract. Underground mining activities will not impact these or any related sites within the tract. Above ground activities or facilities will impact these or any potential sites. The destruction of these surface resources could result in the loss of some data with minimal potential for significance. The total acreage which would be disturbed is 80 acres.

Impacts to the range resources would involve the loss of 5 AUM's of forage over the life of the mine from the surface facilities of the underground mine.

As for impacts associated with visual resources this tract is entirely in a Class III management area. Surface facilities involved with an underground mine would not meet the management objectives for this classification.

The impacts for cultural resources involve five sites and seven isolated occurrences which have been recorded within the tract. The known sites and isolated in this tract may be impacted by the above ground activities associated with the subsurface mining.

The American Indian impacts include 8 known Navajo homesites:

- a. Two homes on T. 22 N., R. 10 W., Section 2: NW1/4, on Indian allotment.
- b. Two homes on T. 22 N., R. 10 W., Section 2: SW1/4, on Indian allotment. Allottees and her children live on this allotment and have not made a response to our consultation letter.
- c. Two homes on T. 22 N., R. 10 W., Section 11: NW1/4, on Indian allotment. Allotment owner lives on this and has responded to our consultation where she wants to go on record as having a firm intent not to consent to leasing of coal under her land.
- d. Two homes on T. 22 N., R. 10 W., Section 10: NW1/4, on Indian allotment. Owner made known she does not want coal development on her land. She lives on it and uses it for grazing.

The sacred burial sites, herb gathering areas, and offerings have not been specifically identified. Although the Navajo medicine men have stated underground mining is still just like surface mining whereas it is destroying or scarring Mother Earth.

KIMBETO #2 TRACT
FEDERAL OWNERSHIP - SURFACE MINE

The Kimbeto #2 Tract, approximately 640 acres in size, is located 46 miles southeast of Farmington, New Mexico. Land surface and coal within the tract are federally owned. The tract total and unleased coal is an estimated 20 million tons of mineable reserves and 18 million tons of recoverable reserves. The expected production rate would be 1 million tons per year for a projected mine life of 20 years. Total expected revenue from federal coal within the tract is \$366 million with an expected federal royalty value of \$45.8 million for the life of the mine. Approximately 35 surface acres would be disturbed annually. Surface disturbance over the life of the mine would total 640 acres.

Approximately 75 employees would be needed to mine the reserves. The mining activities would require approximately 20 acre feet/year of water from deep wells for mining operations.

Surface disturbance on this tract would increase erosion, soil contamination, changing soil characteristics and possible loss or destruction of suitable soils which may occur during overburden removal, stockpiling, and reclamation.

Ground water impacts involve destruction of stratified nature of Fruitland formation overburden and all confining layers above the Pictured Cliffs Sandstone. These would be replaced with crumbled shale and sandstone rubble having a greater porosity than the original stratified material. This may result in upward leakage of water from the underlying Pictures Cliffs

Sandstone which contains water of a greater salinity than the water in the Fruitland formation at some locations.

Possible offsite reduction of well yields, lowering of water levels, and changes in water quality in wells tapping the Fruitland formation and Pictured Cliffs Sandstone.

Withdrawal of 20 acre feet per year of ground water from "deep" aquifer(s) for reclamation and dust suppression would alter ground-water flow near the well(s) and may cause a lowering of water levels in wells trapping the same aquifer in vicinity of the tract.

As for surface water impacts the following would occur:

- a. Runoff from mined area would be impounded, resulting in an unknown but probably small amount of surface water lost to evaporation.
- b. Increase in dissolved and suspended solids concentrations in runoff during reclamation phase until channels stabilize.
- c. Use of saline or sodic ground water from "deep" aquifers may impact water quality of runoff from reclaimed area.
- d. 180 acres of floodplain on Bettonnie Tsosie Wash drainage would be disrupted.

The paleontological impacts show a potential estimate that there are significant fossils contained within the overburden comprising Kimbeto Tract #2. This is indicated by the high number of significant fossil sites located in the stratigraphically related Ah-shi-sle-pah Wash. It is estimated that some or possibly all these sites would be destroyed if the proposed action is implemented.

The estimated fossil localities disturbed in the first year is 5. The total acreage disturbed would be 640 acres. While the estimated total number of fossil localities disturbed is 41.

The range resource impacts would include the loss of 138 AUM's of native forage over the life of the mine from surface mining until revegetation occurs.

The visual resources in this tract are in Class III management area. Surface mining of approximately 35 acres per year would not meet the management objectives for this classification.

The impacts for cultural resources involve three sites which have been located within the tract. The largest is a 98 acre quarry/lithic scatter. The known sites and others in the tract during future inventory would be destroyed by mining activities.

NAGEEZI TRACT
MIXED OWNERSHIP - UNDERGROUND MINE

The Nageezi Tract, approximately 13,120 acres in size, is located 34 miles southeast of Farmington, New Mexico. Of the total 13,120 acres for land surface 10,400 acres are Federal, 1,280 acres are State and 1,440 acres are private. The acreages for the coal reserves are 10,560 acres unleased Federal, and 2,560 acres for State.

The tract contains mineable reserves of unleased Federal at 222.3 million tons with the tract total of 273.17 million tons. This includes coal that could be recovered under Pierre's Site. The recoverable reserves tonnage of unleased Federal is 108.5 million tons with the tract total of 134.2 million tons. The expected production rate would be 1.6 million tons per year for a projected mine life of 67 years. Total expected revenue from federal coal within the tract is \$2.71 billion with an expected federal royalty value of \$217 million for the life of the mine. A maximum of 80 surface acres would be disturbed over the life of the underground mine for placement of the related surface facilities.

Approximately 400 employees would be needed to mine the reserves. The mining activities would require approximately 35 million gallons per year of water from deep wells for mining operations.

The following impacts may occur to ground water:

1. Subsidence may disrupt overlying bedrock aquifer(s) in the Ojo Alamo Sandstone and Nacimiento Formation for fracturing them. This would affect well yields, water levels and possibly water quality in wells tapping those aquifers.
2. Subsidence may disrupt alluvial aquifer and affect well yields, water levels, and possibly quality in wells tapping those aquifers.
3. Approximately 100 acre-feet per year of ground water from "deep" aquifers(s) for dust suppression and reclamation would alter ground-water flow near the well(s) and could cause a lowering of water levels in wells tapping the same aquifer(s) in the vicinity of tract.
4. Two BLM wells exist within the tract. Both are completed in aquifers overlying the coal beds. The quantity or quality of water available to these wells may be affected by subsidence and/or mine dewatering. Some wells outside the tract could also be affected.

A maximum of 80 acres of native vegetation would be destroyed for surface facilities for the underground mine. The range impacts result in a loss of 4 AUM's over the life of the mine.

The visual resource impacts show the majority of this tract is within a Class III management area while a portion is in a VRM Class IV area. Surface facilities associated with an underground mine would not meet the management objectives for either of these classifications.

The impacts for cultural resources show a portion of the 61 recorded sites and 105 recorded localities, isolated artifacts and current cultural

manifestations in the tract outside of the Pierre's Site and defined in PL 96-550, and other resources recorded during future cultural inventories may be impacted by the above ground activities associated with the subsurface mining.

The Pierre's Ruin Community (Pierre's Site) included in PL 96-550 has been withdrawn from surface disturbance. All of Section 12 and the W1/2 of Section 7 has been nominated to the National Register of Historic places as the Pierre's Archaeological District. Subsidence of the surface due to subsurface mining may occur during or after mining operations.

The American Indian impacts include 6 known Navajo homesites:

- a. A large house located on T. 23 N., R. 10 W., Section 8: SE1/4SW1/4.
- b. A house on T. 24 N., R. 10 W., Section 34: SW1/4SW1/4 on Indian allotment.
- c. Two houses in T. 24 N., R. 10 W., Section 28: NW1/4NE1/4 on Indian allotment.
- d. One house with corrals located in T. 24 N., R. 10 W., Section 29: SW1/4NW1/4 on Indian allotment.
- e. A new house near the NE1/4 corner of Section 30, T. 24 N., R. 10 W.

These areas are under grazing lease to the Navajo Tribe, under Section 15 of the Taylor Grazing Act.

The sacred burial sites, herb gathering areas, and offerings have not been specifically identified, but the Navajo Medicine men have stated underground mining is still just like surface mining whereas it is destroying or scarring Mother Earth.

GALLO WASH #1 TRACT
MIXED OWNERSHIP - SURFACE MINE

The Gallo Wash #1 Tract, approximately 320 acres in size, is located 38 miles west of Cuba, New Mexico. Of the total 320 acres for land surface 120 acres are unleased Federal, and 200 acres are withdrawn under Public Land Order 2198 for Indian Use. The acreages for the coal reserves are 320 acres unleased Federal.

The tract contains mineable reserves of unleased Federal at 11.0 million tons with the tract total of 11.0 million tons. The recoverable reserves tonnage of unleased Federal is 10.0 million tons with the tract total of 10.0 million tons. The expected production rate would be 2.0 million tons per year for a projected mine life of 7 years. Total expected revenue from federal coal within the tract is \$190 million with an expected federal royalty value of \$23.8 million for the life of the mine. Approximately 67 surface acres would be disturbed annually. Surface disturbance over the life of the mine would total 320 acres.

Approximately 150 employees would be needed to mine the reserves. The mining activities would require approximately 100 acre feet/year of water from deep wells for reclamation and dust control.

Surface disturbance on this tract would increase erosion, soil contamination, changing soil characteristics and possible loss or destruction of suitable soils which may occur during overburden removal, stockpiling, and reclamation.

Ground water impacts include the following.

- a. Destruction of stratified nature of Fruitland formation overburden and all confining layers above the Pictured Cliffs Sandstone. These would be replaced with crumbled shale and sandstone rubble having a greater porosity than the original stratified material. This may result in upward leakage from the underlying Pictured Cliffs Sandstone which contains water of a much greater salinity than the water in the Fruitland formation at some locations.
- b. Possible withdrawal of 100 acre feet per year of ground water from "deep" aquifer(s) for reclamation and dust suppression would alter ground water flow near the well(s) and may cause a lowering of water levels in wells tapping the same aquifer in the vicinity of the tract.

Paleontological resource impacts show that there are approximately 9 recorded fossil sites located within or immediately adjacent to the Gallo Wash #1 (Bypass) tract. It is estimated that there are, potentially, at least 20 more fossil sites not recorded. Some or all of these sites would be destroyed during mining operations. The disruption and rearrangement of fossils from their original position in the strata will destroy associations of fossils and hinder taxonomic and paleontological studies. Removal or disturbance of fossils will likewise preclude biostratigraphic studies based on successions of species or assemblages.

The estimated fossil localities disturbed in the first year would be 10. The total acreage disturbed will be 420 acres. While the estimated total number of fossil localities disturbed would be 41.

Impacts to the range resources would involve the loss of 38 AUM's of forage over the life of the mine until reclamation is effective.

The visual resources in this tract are in Class III management area while a portion is in a VRM Class IV area. Surface mining would not meet the management objectives for either of these classifications.

The American Indian impacts show burial sites, herb gathering areas, sacred or offering points have not been identified. If any are identified, they would be impacted by surface mining which would violate the American Indian Religious Freedom Act PL-341.

As for any recreational impacts surface mining activities on Gallo Wash #1 could disrupt the Continental Divide National Scenic Trail location.

GALLO WASH #2 TRACT
MIXED OWNERSHIP - UNDERGROUND MINE

The Gallo Wash #2 Tract, approximately 1,680 acres in size, is located 40 miles west of Cuba, New Mexico. Of the total 1,680 acres for land surface 600 acres are unleased Federal, 880 acres are State and 200 acres are private. The acreages for the coal reserves are 760 acres unleased Federal, 720 acres for State and 200 acres for private.

The tract contains mineable reserves of unleased Federal at 17.1 million tons with the tract total of 36.6 million tons. The recoverable reserves tonnage of unleased Federal is 9 million tons with the tract total of 18.3 million tons. The expected production rate would be 1.0 million tons per year for a projected mine life of 12 years. Total expected revenue from federal coal within the tract is \$215 million with an expected federal royalty value of \$17.2 million for the life of the mine. A maximum of 80 surface acres would be disturbed over the life of the underground mine for placement of the related surface facilities.

Approximately 250 employees would be needed to mine the reserves. The mining activities would require approximately 23 million gallons of water per year from deep wells for mining operations.

Ground water impacts include the following:

- a. Subsidence might disrupt overlying bedrock aquifers in the Ojo Alamo Sandstone by fracturing, and affect potential local ground water supplies from this aquifer.
- b. Subsidence might disrupt alluvial aquifer and affect potential local supplies of shallow ground water.
- c. Seepage of water from the underlying Pictured Cliffs Sandstone into the mine might affect the yield and water level of one well completed in this aquifer about one mile west of the tract.

Paleontological resource impacts show that there is one recorded fossil site in Gallo Wash #2 tract located in T. 21 N., R. 8 W., Section 2: SW1/4SW1/4. However there will be no significant impact. There would be a total of 80 acres disturbed in this tract.

Impacts to the range resources would involve the loss of 7 AUM's of forage over the life of the mine from the surface facilities of the underground mine. Two reservoirs and one cattleguard may be destroyed by location of surface facilities.

The cultural resources impacts indicated two isolated artifacts and no sites recorded in the portions of the tract containing Federal coal or surface. Sites may be destroyed by surface activities associated with

subsurface mining. The American Indian impacts include 6 known Navajo dwellings: three homes on the NW1/4, Section 11, T. 21 N., R. 8 W., on public land which is being considered in the Navajo Land Exchange. Three homes on the NE1/4, Section 10, T. 21 N., R. 8 W., on public land which is being considered in the Navajo Land Exchange. Three of these homes may be on the dividing line between tracts 2 and 3.

BISTI #6/8 TRACT
MIXED OWNERSHIP - SURFACE MINE

The Bisti #6/8 Tract, approximately 520 acres in size, is located 31 miles south of Farmington, New Mexico. The total 520 acres of land surface, 240 acres are Federal and 280 are private. The acreages for the coal reserves are 520 acres unleased Federal.

The tract contains mineable reserves of unleased Federal at 1.0 million tons with the tract total of 1.0 million tons. The recoverable reserves tonnage of unleased Federal is 1.0 million tons with the tract total of 1.0 million tons. The expected production rate would be .25 million tons per year for a projected mine life of 4 years. Total expected revenue from federal coal within the tract is \$18.2 million with an expected federal royalty value of \$2.30 million for the life of the mine. Approximately 63 surface acres would be disturbed annually. Surface disturbance over the life of the mine would total 110 acres.

Approximately 20 employees would be needed to mine the reserves. The mining activities would require approximately 40 acre feet/year of water from deep wells for reclamation and dust control.

Air quality impacts show the estimated maximum off-site total suspended particulate (TSP) would be 25 micro grams per cubic meter (ug/m³). Background air quality in the area is estimated at (30 ug/m³). This would give a total of 55 ug/m³ compared to the annual New Mexico standard of 60 ug/m³. The air quality could exceed the annual New Mexico standard if operational procedures are not instituted.

Surface disturbance on this tract would increase erosion, soil contamination, changing soil characteristics and possible loss or destruction of suitable soils which may occur during overburden, removal, stockpiling, and reclamation.

Ground water impacts include the following:

- a. Destruction of stratified nature of Fruitland formation overburden and all confining layers above the Pictured Cliffs Sandstone. These would be replaced with crumbled shale and sandstone rubble having a greater porosity than the original stratified material. This may result in upward leakage from the underlying Pictured Cliffs Sandstone which contains water of a much greater salinity than the water in the Fruitland formation at some locations.

- b. Local destruction of potential shallow sources of ground water as mining proceeds through alluvial channels.
- c. Less runoff locally to alluvial channels downstream during mining and after reclamation, with possibly less recharge to ground water in the alluvium.

The paleontological resource impacts show an estimated 5 fossil localities disturbed in the first year. The total of 110 acres would be disturbed. While the estimated total number of fossil localities disturbed would be 33. There are thirteen recorded fossil sites within Bisti Tract #8 in T. 23 N., R. 13 W., Section 6: NW1/4, NE1/4 and SE1/4SE1/4. None of these sites are considered significant, however, potential importance remains high due to the stratigraphic relationship of this area with the Bisti Badlands area. Implementation of the Proposed Action could lead to the destruction of some or all of the fossil-collecting sites in this area.

Impacts to the range resources would involve the loss of 20 AUM's of forage over the life of the mine. While drainage to one reservoir south of the tract in Section 15 would be destroyed.

The visual resource impacts in this tract are in Class III and IV management area. Surface mining would not meet the management objectives for this classification and would destroy topography and scenic features to fragile badlands and the visual quality to the adjacent Bisti/De-na-zin ACEC (proposed).

The impacts for cultural resources involve two Navajo graves from an unknown date and two cultural resources sites occur in the tract. Sites in the tract would be destroyed by mining activities.

The American Indian impacts include 2 known Navajo dwellings:

One home on NE1/4, Section 15, T. 23 N., R. 13 W., on Indian allotted land.

One home on NW1/4, Section 17, T. 23 N., R. 13 W., on Indian allotted land.

These homes would be destroyed if mining occurs.

These areas are under grazing lease to the Navajo Tribe under Section 15 of the Taylor Grazing Act. Each permittee is paying by the acre to graze these lands.

There are also two sacred burial sites on the NW1/4 corner of Section 15, T. 23 N., R. 13 W., and there may be others.

The recreation impacts on this tract shows that surface facilities and mining could destroy topographic and scenic features. This area has been recognized as having high quality scenic resources and has been particularly noted for its geologic sightseeing values.

The wilderness impacts shows that sights and sounds associated with the adjacent surface mining of Bisti 6/8 could disrupt the naturalness and opportunities for solitude in the Bisti WSA.

LEE RANCH EAST TRACT
MIXED OWNERSHIP - SURFACE MINE

The Lee Ranch East Tract, approximately 1,817 acres in size, is located 30 miles northeast of Grants, New Mexico. The total 1,817 acres of land surface are private. The acreages for the coal reserves are 969 acres unleased Federal, and 848 acres for private.

The tract contains mineable reserves of unleased Federal at 16.0 million tons with the tract total of 38.0 million tons. The recoverable reserves tonnage of unleased Federal is 14.0 million tons with the tract total of 33.0 million tons. The expected production rate would be 800,000 tons per year for a projected mine life of 40 years. Total expected revenue from federal coal within the tract is \$272 million with an expected federal royalty value of \$34 million for the life of the mine. Approximately 24 surface acres would be disturbed annually. Surface disturbance over the life of the mine would total 969 acres.

Approximately 60 employees would be needed to mine the reserves. The mining activities would require approximately 38 acre feet/year of water from deep wells for reclamation and dust control.

Surface disturbance on this tract would increase erosion, soil contamination, changing soil characteristics and possible loss or destruction of suitable soils which may occur during overburden removal, stockpiling, and reclamation.

Ground water impacts include the following:

- a. Destruction of stratified nature of Menefee formation (Cleary Coal Member) and all confining layers above the Point Lookout Sandstone. These would be replaced with crumbled shale and sandstone rubble having a greater porosity than the original stratified material. This may result in upward leakage of water from the underlying Point Lookout Sandstone, which may contain water of a much greater salinity than the water in the Menefee formation at some locations.
- b. The coal deposits of this area are also the major aquifers tapped by wells in the area. Offsite reduction of spring and well yields, lowering of water levels, and changes in water quality in wells tapping the Menefee formation and Point Lookout Sandstone would result.
- c. One flowing well and two springs exist within the tract. If these are located in areas to be mined they would be destroyed.

The paleontological resource shows no survey data for this tract. However, 1,019 total acres would be disturbed.

Impacts to the range resources would involve the temporary loss of 255 AUM's of native forage over the life of the mine.

As for any recreational impacts, surface mining activities on Lee Ranch East could disrupt the Continental Divide National Scenic Trail location.

No cultural resources are known to have been recorded. However, fourteen sections have been inventoried for cultural resources within or adjacent to the Lee Ranch tracts. If similar site densities occur in the parcels of this tract it is predicted there may be between 10 and 35 sites.

LEE RANCH MIDDLE TRACT MIXED OWNERSHIP - SURFACE MINE

The Lee Ranch Middle Tract, approximately 14,384 acres in size, is located 25 miles Northwest of Grants, New Mexico. Of the total 14,384 acres for land surface 1,120 acres are State and 13,264 acres are private. The acreages for the coal reserves are 4,744 acres unleased Federal, 1,120 acres for State and 8,520 acres for private.

The tract contains mineable reserves of unleased Federal at 86.0 million tons with the tract total of 240.0 million tons. The recoverable reserves tonnage of unleased Federal is 73.0 million tons with the tract total of 204.0 million tons. The expected production rate would be 5.1 million tons per year for a projected mine life of 40 years. Total expected revenue from federal coal within the tract is \$1,469 million with an expected federal royalty value of \$182.5 million for the life of the mine. Approximately 148 surface acres would be disturbed annually. Surface disturbance over the life of the mine would total 5,904 acres.

Approximately 382 employees would be needed to mine the reserves. The mining activities would require approximately 1,000 acre feet/year of water from deep wells for reclamation and dust control.

Surface disturbance on this tract would increase erosion, soil contamination, changing soil characteristics and possible loss or destruction of suitable soils which may occur during overburden removal, stockpiling, and reclamation.

The air quality impacts show the estimated maximum off-site total suspended particulates (TSP) would be 29 micrograms per cubic meter (ug/m^3). Background air quality in the area is estimated at ($30 \text{ ug}/\text{m}^3$). This would give a total of $59 \text{ ug}/\text{m}^3$ compared to the annual New Mexico standard of $60 \text{ ug}/\text{m}^3$. The Lee Ranch Mine currently has a PSD exemption from the Environmental Protection Agency because of emission control measures that will be completed.

Ground water impacts include the following:

- a. Destruction of stratified nature of Menefee formation (Cleary Coal Member) and all confining layers above the Point Lookout Sandstone. These would be replaced with crumbled shale and sandstone rubble having a greater porosity than the original stratified material. This may result in upward leakage of water from the underlying Point Lookout Sandstone, which may contain water of a much greater salinity than the water in the Menefee formation at some location.
- b. The coal deposits of this area are also the major aquifers tapped by stock wells in the area. Offsite reduction of well yields, lowering of water levels, and changes in water quality in wells tapping the Menefee formation and Point Lookout Sandstone would result.
- c. Offsite reduction of spring yields and water quality would occur.
- d. 5 wells (4 flow) and approximately 10 springs exist within the tract. If these are located in areas to be mined they would be destroyed.

The paleontological resource impacts show that there are two recorded fossil sites known in the study area. One of these sites is considered to be significant. It is located in the NW1/4SE1/4NE1/4 of Section 35: T. 15 N., R. 8 W. This site contains a diverse and well preserved assemblage of plant fossils of the Menefee formation. There is approximately 6,104 total acres that would be disturbed.

Impacts to the range resources would involve the temporary loss of 1,606 AUM's of native forage over the life of the mine.

The cultural resource impacts indicate six sites that have been recorded within the tract parcels containing Federal coal. Fourteen sections have been inventoried for cultural resources within or adjacent to the Lee Ranch tracts. If similar densities occur in the parcels containing Federal coal of this tract it is predicted there may be between 32 and 43 sites.

As for any recreational impacts, surface mining activities on Lee Ranch Middle could disrupt the Continental Divide National Scenic Trail location.

LEE RANCH WEST TRACT
MIXED OWNERSHIP - SURFACE MINE

The Lee Ranch West Tract, approximately 13,051 acres in size, is located 30 miles Northwest of Grants, New Mexico. Of the total 13,051 acres for land surface 160 acres are unleased Federal, 1,120 acres are State and 11,771 acres are private. The acreages for the coal reserves are 5,770 acres unleased Federal, 1,120 acres for State and 6,161 acres for private.

The tract contains mineable reserves of unleased Federal at 101.0 million tons with the tract total of 238.0 million tons. The recoverable

reserves tonnage of unleased Federal is 86.0 million tons with the tract total of 202.0 million tons. The expected production rate would be 5.0 million tons per year for a projected mine life of 25 years. Total expected revenue from federal coal within the tract is \$1,717 million with an expected federal royalty value of \$214.625 million for the life of the mine. Approximately 188 surface acres would be disturbed annually. Surface disturbance over the life of the mine would total 7,539 acres.

Approximately 375 employees would be needed to mine the reserves. The mining activities would require approximately 1,000 acre feet/year of water from deep wells for reclamation and dust control.

Surface disturbance on this tract would increase erosion, soil contamination, changing soil characteristics and possible loss or destruction of suitable soils which may occur during overburden removal, stockpiling, and reclamation.

The air quality impacts show the estimated maximum off-site total suspended particulates (TSP) would be 29 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$). Background air quality in the area is estimated at ($30 \mu\text{g}/\text{m}^3$). This would give a total of $59 \mu\text{g}/\text{m}^3$ compared to the annual New Mexico standard of $60 \mu\text{g}/\text{m}^3$. The air quality could exceed the annual New Mexico standard if operational procedures are not instituted.

The ground water impacts include the following:

- a. Destruction of stratified nature of Menefee formation (Cleary Coal Member) and all confining layers above the Point Lookout Sandstone. These would be replaced with crumbled shale and sandstone rubble having a greater porosity than the original stratified material. This may result in upward leakage of water from the underlying Point Lookout Sandstone, which may contain water of a much greater salinity than the water in the Menefee formation at some locations.
- b. The coal deposits of this area are also the major aquifers tapped by stock wells in the area. Offsite reduction of well yields, lowering of water levels, and changes in water quality in wells tapping the Menefee formation and Point Lookout Sandstone would result.
- c. Offsite reduction of spring yields and water quality would occur.
- d. Three wells exist within the tract; one of these is a flowing well. If these are located in areas to be mined they would be destroyed.

The paleontological resource impacts show that there are two recorded fossil sites known in the study area. One of these sites is considered to be significant. It is located in the NW1/4SE1/4NE1/4 of Section 35: T. 15 N., R. 8 W. This site contains a diverse and well preserved assemblage of plant fossils of the Menefee formation. There are approximately 7,739 total acres that would be disturbed.

Impacts to the range resources would involve the loss of 1935 AUM's of native forage over the life of the mine.

The cultural resource impacts indicate twenty seven sites have been recorded within the tract parcels containing Federal coal. Also recorded are several segments of the Chacoan Roadway system. Fourteen sections have been inventoried for cultural resources within or adjacent to the Lee Ranch tracts. If similar site densities occur in the parcels containing Federal coal of this tract it is predicted there may be between 70 and 100 sites.

As for any recreational impacts, surface mining on Lee Ranch West could disrupt the Continental Divide National Scenic Trail location.

DIVIDE TRACT
MIXED OWNERSHIP - SURFACE MINE

The Divide Tract, approximately 6,889 acres in size, is located 30 miles North of Grants, New Mexico. Of the total 6,889 acres for land surface, 400 acres are unleased Federal, 640 acres are State and 5,849 acres are private. The acreages for the coal reserves are 3,031 acres unleased Federal, 640 acres for State and 3,218 acres for private.

The tract contains mineable reserves of unleased Federal at 16.0 million tons with the tract total of 43.0 million tons. The recoverable reserves tonnage of unleased Federal is 14.0 million tons with the tract total of 37.0 million tons. The expected production rate would be 1.0 million tons per year for a projected mine life of 40 years. Total expected revenue from federal coal within the tract is \$272 million with an expected federal royalty value of \$34 million for the life of the mine. Approximately 75 surface acres would be disturbed annually. Surface disturbance over the life of the mine would total 3,000 acres.

Approximately 75 employees would be needed to mine the reserves. The mining activities would require approximately 50 acre feet/year of water from deep wells for reclamation and dust control.

Surface disturbance on this tract would increase erosion, soil contamination, changing soil characteristics and possible loss or destruction of suitable soils which may occur during overburden removal, stockpiling, and reclamation.

The ground water impacts include the following:

- a. Destruction of stratified nature of Gibson Coal Member of the Crevasse Canyon formation overburden and all confining layers above the Dalton Sandstone Member of the Crevasse Canyon formation. These would be replaced with crumbled shale and sandstone rubble having a greater porosity than the original stratified material. This may result in upward leakage of water from the underlying Dalton Sandstone Member which may contain water of a much greater salinity than the water in the Gibson Coal Member at some locations.
- b. Possible offsite reduction of stock well yields, lowering of water levels, and changes in water quality in wells tapping the Dalton Sandstone Member.

- c. One well exists within the tract. This well is owned by the Navajo Tribe. If it is located in an area to be mined it would be destroyed. If not located in an area to be mined, the yield and water level would likely be affected by wells drilled into the Gallup Sandstone for reclamation water.

The paleontological resource impacts show that there several recorded fossil sites on the tract, five of which are are considered significant. These are located in T. 16 N., R. 10 W., Section 36: NE1/4SE1/4; Section 25: SE1/4SW1/4; Section 23: NW1/4SE1/4, and SW1/4NE1/4; Section 2: NE1/4SW1/4NE1/4; Section 1: NE1/4NE1/4SW1/4. There are approximately 3,100 total acres that would be destroyed.

Impacts to the range resources would involve the loss of 282 AUM's of native forage over the life of the mine.

The cultural resource impacts indicate five sites have been recorded in portions of the tract containing Federal coal or surface. Cultural resource inventories have been conducted to the north, west, and east. If similar site densities occur across this tract it is predicted there may be between 48 and 105 sites.

Recreational impacts show that the Continental Divide passes close by this tract. Surface mining would have a serious aesthetic impact upon the Continental Divide National Scenic Trail if it is routed through this area.

The American Indian impacts include 3 known Navajo dwellings: three homes on the NW1/4, Section 4, T. 15 N., R. 10 W., on Indian allotted land.

HOSPAH #1 TRACT
MIXED OWNERSHIP - SURFACE MINE

The Hospah #1 Tract, approximately 17,960 acres in size, is located 30 miles north of Grants, New Mexico. Of the total 17,960 acres for land surface 2,080 acres are State and 15,880 acres are private. The acreages for the coal reserves are 1,600 acres unleased Federal, 1,920 acres for State and 14,440 acres for private.

The tract contains mineable reserves of unleased Federal at 22.0 million tons with the tract total of 218 million tons. The recoverable reserves tonnage of unleased Federal is 19.0 million tons with the tract total of 186 million tons. The expected production rate would be 10.3 million tons per year for a projected mine life of 20 years. Total expected revenue from federal coal within the tract is \$374 million with an expected federal royalty value of \$46.8 million for the life of the mine. Approximately 80 surface acres would be disturbed annually for unleased Federal coal. Surface disturbance over the life of the mine would total 1,440 acr

Approximately 75 employees would be needed to mine the reserves. The mining activities would require approximately 60 acre feet/year of water from deep wells for reclamation and dust control.

Surface disturbance on this tract would increase erosion, soil contamination, changing soil characteristics and possible loss or destruction of suitable soils which may occur during overburden removal, stockpiling, and reclamation.

The ground water impacts include the following:

- a. Destruction of stratified nature of Cleary Coal Member of Menefee formation overburden and all confining layers above the Point Lookout Sandstone. These would be replaced with crumbled shale and sandstone rubble having greater porosity than the original stratified material. This could result in upward leakage of water from the underlying Point Lookout Sandstone, which may contain water of a greater salinity than the water in the Menefee formation in this vicinity.
- b. Possible offsite reduction of well yields, lowering of water levels, and changes in water quality in wells tapping the Menefee formation and Point Lookout Sandstone.
- c. Four known wells exist within the tract. Three of these are completed in the Point Lookout Sandstone and/or Menefee formation. The other well taps deeper aquifers. Any wells located in areas to be mined would be destroyed, regardless of the aquifer tapped.

The paleontological resource impacts indicate through reconnaissance reports the presence of potentially fossiliferous outcrops throughout the Hospah Tract. However, no significant impacts have been found. The total acres disturbed in the area would be 80.

Impacts to the range resources would involve the loss of 173 AUM's of native forage over the life of the mine.

The cultural resource impacts indicate four sites have been recorded in the portions of the tract with Federal minerals. A portion of a Chacoan Roadway crosses the tract. The South Hospah mine survey found an average site density of 13 sites per section. If a similar site density occurs in the portions of the tract with Federal minerals it is predicted there may be approximately 33 sites.

Recreational impacts show that the Continental Divide passes through this tract. Mining and associated surface facilities could have an aesthetic impact upon the Continental Divide National Scenic Trail if it is routed through here.

HOSPAH #2 TRACT
MIXED OWNERSHIP - UNDERGROUND MINE

The Hospah #2 Tract, approximately 3,160 acres in size, is located 30 miles north of Grants, New Mexico. Of the total 3,160 acres for land surface 640 acres are State and 2,520 acres are private. The acreages for the coal reserves are 640 acres unleased Federal, and 2,520 acres for private.

The tract contains mineable reserves of unleased Federal at 10 million tons with the tract total of 59 million tons. The recoverable reserves tonnage of unleased Federal is 5 million tons with the tract total of 30 million tons. The expected production rate would be 2.9 million tons per year for a projected mine life of 13 years. Total expected revenue from federal coal within the tract is \$125 million with an expected federal royalty value of \$1 million for the life of the mine. A maximum of 80 surface acres would be disturbed over the life of the underground mine for placement of the related surface facilities.

Approximately 125 employees would be needed to mine the reserves. The mining activities would require approximately 40 acre feet/year of water from deep wells for mining operations.

The ground water impacts include the following:

- a. Subsidence might disrupt overlying bedrock aquifer(s) in the Menefee formation by fracturing them. This could affect well yields, water levels, and possibly water quality in wells tapping this aquifer in the vicinity of the tract.

Paleontological resources show that there is not expected to be any direct impact on potential fossil material from underground mining, however, there could be negative indirect impact from related activities and facilities on the surface. There would be a total of 80 acres disturbed in this tract.

Impacts to the range resources would involve the loss of 9 AUM's of forage over the life of the mine on the surface facilities of the underground mine.

Recreational impacts show that the Continental Divide passes through this tract. Mining and associated surface facilities could have an aesthetic impact upon the Continental Divide National Scenic Trail if it is routed through here.

The cultural resource impacts show that one site has been recorded in the portion of the tract with Federal minerals. The South Hoshpah mine survey found an average site density of 13 sites per section. If a similar density occurs in the section of Federal minerals it is predicted there may be approximately 13 sites.

GAMERCO #1 (BYPASS) HC TRACT
MIXED OWNERSHIP - SURFACE MINE

The Gamerco #1 (Bypass) HC Tract, approximately 440 acres in size, is located 9 miles northwest of Gallup, New Mexico. The total 440 acres of land surface are private. The acreages for the coal reserves are 360 acres unleased Federal and 80 acres of private.

The tract contains mineable reserves of unleased Federal at 3.0 million tons with the tract total of 4.0 million tons. The recoverable reserves tonnage of unleased Federal is 3.0 million tons with the tract total

of 4.0 million tons. The expected production rate would be 140,000 tons per year for a projected mine life of 22 years. Total expected revenue from federal coal within the tract is \$56 million with an expected federal royalty value of \$7 million for the life of the mine. Approximately 8 surface acres would be disturbed annually. Surface disturbance over the life of the mine would total 150 acres.

Approximately 11 employees would be needed to mine the reserves. The mining activities would require approximately 15 acre feet/year of water from deep wells for reclamation and dust control.

Surface disturbance on this tract would increase erosion, soil contamination, changing soil characteristics and possible loss or destruction of suitable soils which may occur during overburden removal, stockpiling, and reclamation.

The ground water impacts include the following:

- a. Destruction of stratified nature of Crevasse Canyon formation overburden and all confining layers above the Gallup Sandstone. These would be replaced with crumbled shale and sandstone rubble having a greater porosity than the original stratified material. This may result in downward leakage of water from the overlying Crevasse Canyon formation which may contain water of a greater salinity than the water in the Gallup Sandstone at this location.
- b. Possible offsite reduction of well yields, lowering of water levels, and changes in water quality in wells tapping the Menefee formation, Crevasse Canyon formation and Gallup Sandstone.

The paleontological resources show that there is potential for the presence of fossiliferous exposures containing important fossils. However, there is no survey data to date. The estimated total acreage disturbed would be 125.

Impacts to the range resources would involve the loss of 23 AUM's of native forage over the life of the mine.

The American Indian impacts include 2 known Navajo dwellings: Two homes on SW1/4, Section 34: T. 16 N., R. 19 W., on Indian allotment.

BISTI #4 TRACT
MIXED OWNERSHIP - SURFACE MINE

The Bisti #4 Tract, approximately 2,680 acres in size, is located 52 miles southeast of Farmington, New Mexico. Of the total 2,680 acres for land surface 1,040 acres are unleased Federal, 80 acres are State and 1,560 acres are private (E.O. 1483 - 200 Acres). The acreages for the coal reserves are 2,600 acres unleased Federal, and 80 acres for State.

The tract contains mineable reserves and resources of unleased Federal at 35 million tons with the tract total of 36.0 million tons. The recoverable reserves and resources tonnage of unleased Federal is 30.0 million tons with the tract total of 30.0 million tons. The expected production rate would be 1.0 million tons per year for a projected mine life of 32 years. Total expected revenue from federal coal within the tract is \$592 million with an expected federal royalty value of \$74 million for the life of the mine. Approximately 60 surface acres would be disturbed annually for unleased Federal coal. Surface disturbance over the life of the mine would total 1,900 acres for unleased Federal Coal.

Approximately 75 employees would be needed to mine the reserves. The mining activities would require approximately 35 acre feet/year from deep wells for reclamation and dust control.

Surface disturbance on this tract would increase erosion, soil contamination, changing soil characteristics and possible loss or destruction of suitable soils which may occur during overburden, removal, stockpiling, and reclamation.

The ground water impacts include the following:

- a. Destruction of stratified nature of Fruitland formation overburden and all confining layers above the Pictured Cliffs Sandstone. These would be replaced with crumbled shale and sandstone rubble having a greater porosity than the original stratified material. This may result in upward leakage from the underlying Pictured Cliffs Sandstone which contains water of a much greater salinity than the water in the Fruitland formation at some locations.
- b. Possible offsite reduction of well yields, lowering of water levels, and changes in water quality in wells tapping the Cliff House Sandstone.

The paleontological resources show that there are 15 recorded fossil sites located within this tract. They are located in T. 23 N., R. 12 W., Section 26: S1/2S1/2, Section 35: N1/2N1/2. Most of these sites and the exposures in Section 34: NE1/4 contain potentially significant fossils. The estimated fossil localities disturbed in the first year would be 10. The total acreage figure will be 3,504. While the estimated total number of fossil localities disturbed would be 120.

Impacts to the range resources would involve the temporary loss of 134 AUM's of native forage. While one reservoir and one reservoir drainage would be destroyed over the life of the mine.

The cultural resource impacts show that one locality has been recorded. However, no sites have been recorded in this tract.

Recreational impacts show that this tract is in an area which contains high quality opportunities for geological sightseeing. Many types of fossils can be found here. Surface mining would destroy the sightseeing opportunities here.

The wildlife impacts indicate that there is an active (1981) ferruginous hawk nest (Unsuitability Criteria #14) in Bisti #4B, T. 23 N., R. 12 W., Section 35. However a buffer zone decided on by BLM and USFWS (5-24-81) takes in 25 acres of Section 35: NW1/4NW1/4 which is part of Bisti #4A.

Another active ferruginous hawk nest (Unsuitability Criteria #14) is located in T. 23 N., R. 12 W., Section 35: SW1/4NW1/4. A buffer zone agreed upon by BLM and USFWS (6-24-81) encompasses approximately 20 acres in Section 34: SE1/4NE1/4 and 70 acres in Section 35: NW1/4

The following American Indian sacred areas have been identified:

- a. NW1/4NW1/4, Section 35, and N1/2N1/2, Section 34 have been designated as areas of herb gatherings in the MFP. The S1/2S1/2 of Section 26 should be included as herbs usually grow around higher areas.
- b. The S1/2N1/2 of Section 34 and SW1/4NW1/4, E1/2NW1/4, NE1/4, Section 35 have been designated to be a herb gathering area in the MFP.

JOHNSON TRADING POST TRACT
MIXED OWNERSHIP - SURFACE MINE

The Johnson Trading Post Tract, approximately 3,440 acres in size, is located 15 miles southwest of Cuba, New Mexico. Of the total 3,440 acres for land surface 2,480 acres are unleased Federal and 960 acres are private. The acreages for the coal reserves are 2,720 acres unleased Federal 720 acres for private.

The tract contains mineable reserves of unleased Federal at 17.0 million tons with the tract total of 18.0 million tons. The recoverable reserves tonnage of unleased Federal is 14.0 million tons with the tract total of 16.0 million tons. The expected production rate would be .40 million tons per year for a projected mine life of 42 years. Total expected revenue from federal coal within the tract is \$280 million with an expected federal royalty value of \$35 million for the life of the mine. Approximately 86 surface acres would be disturbed annually. Surface disturbance over the life of the mine would total 3,440 acres.

Approximately 30 employees would be needed to mine the reserves. The mining activities would require approximately 60 acre feet/year from deep wells for reclamation and dust control.

Surface disturbance on this tract would increase erosion, soil contamination, changing soil characteristics and possible loss or destruction of suitable soils which may occur during overburden, removal, stockpiling, and reclamation.

The ground water impacts include the following:

- a. Destruction of stratified nature of Fruitland formation overburden and all confining layers above the Pictured Cliffs Sandstone. These would be replaced with crumbled shale and sandstone rubble having a greater porosity than the original stratified material. This may result in upward leakage from the underlying Pictured Cliffs Sandstone which contains water of a much greater salinity than the water in the Fruitland formation at some locations.
- b. Four known wells exist within the tract. Any of these located in areas to be mined would be destroyed, regardless of the producing aquifer. Yields, water levels, and water quality of wells tapping the Quaternary alluvium and Pictured Cliffs Sandstone, but not in mined areas may be affected.

Paleontological material would be adversely impacted in Section 1, T. 20 N., R. 4 W., and the NE1/2, NE1/4, Section 11. There are six documented fossil sites within or immediately adjacent to the leasing boundary. The estimated fossil localities disturbed in the first year would be 11. The total acreage figure will be 3,504. While the estimated total number of fossil localities disturbed would be 317.

Impacts to the range resources would involve the loss of 328 AUM's of native forage over the life of the mine. A drainage area of one reservoir would be cut off.

Major wildlife impacts include one active golden eagle nest which is located in the north part of the tract; T. 19 N., R. 4 W., Section 1. Unsuitability Criteria #11 would apply in this area. Destruction of the spring in T. 19 N., R. 4 W., Section 1 would displace long-eared owls roosting at the spring. The spring would also provide habitat for migratory non-game birds and this habitat would be lost with surface mining. Critical time for spring-time migrants would be April 15 through June 15 when heaviest concentrations of birds would occur.

Most of this tract is within a visual resource Class III management area while a portion is in a VRM Class IV area. Surface mining would not meet the management objectives for either of these classifications.

The cultural resource impacts show that one site has been recorded in the portions of the tract containing Federal coal or surface.

The American Indian impacts include 8 known Navajo dwellings:

- a. One home located on the NE1/4, Section 9, T. 19 N., R. 4 W., on public land, its on the outside edge or on the line of Navajo Land Exchange.
- b. Seven homes located on the NW1/4, Section 7, T. 19 N., R. 3 W., on Indian allotted lands.

STAR LAKE EAST #1 TRACT
MIXED OWNERSHIP - SURFACE MINE

The Star Lake East #1 Tract, approximately 2,000 acres in size, is located 22 miles southwest of Cuba, New Mexico. Of the total 2,000 acres for land surface 1,364 acres are unleased Federal, 80 acres are State and 556 acres are private. The acreages for the coal reserves are 1,840 acres unleased Federal, 80 acres for State and 80 acres for private.

The tract contains mineable reserves of unleased Federal at 61.0 million tons with the tract total of 67.0 million tons. The recoverable reserves tonnage of unleased Federal is 52.0 million tons with the tract total of 57.0 million tons. The expected production rate would be 2.0 million tons per year for a projected mine life of 32 years. Total expected revenue from federal coal within the tract is \$1.03 billion with an expected federal royalty value of \$128.8 million for the life of the mine. Approximately 70 surface acres would be disturbed annually. Surface disturbance over the life of the mine would total 2,040 acres.

Approximately 150 employees would be needed to mine the reserves. The mining activities would require approximately 100 acre feet/year of water from deep wells for reclamation and dust control.

Surface disturbance on this tract would increase erosion, soil contamination, changing soil characteristics and possible loss or destruction of suitable soils which may occur during overburden, removal, stockpiling, and reclamation.

The ground water impacts include the following:

- a. Destruction of stratified nature of Fruitland formation overburden and all confining layers above the Pictured Cliffs Sandstone. These would be replaced with crumbled shale and sandstone rubble having a greater porosity than the original stratified material. This may result in upward leakage from the underlying Pictured Cliffs Sandstone which contains water of a much greater salinity than the water in the Fruitland formation at some locations.
- b. Possible offsite reduction of well yields, lowering of water levels, and changes in water quality in wells tapping the Quaternary alluvium, Fruitland formation, and Pictured Cliffs Sandstone.

The Paleontological resources show that there are six documented fossil sites within the boundaries of Star Lake East #1, all are considered low significance except locality BUNM-77-898. Due to the fossiliferous nature of Kirtland/Fruitland outcrops in this tract it is estimated that 60 potentially significant fossil sites would be destroyed during mining operations. The estimated fossil localities disturbed in the first year would be 10. The total acreage figure will be 2,140. While the estimated total number of fossil localities disturbed would be 248.

Impacts to the range resources would involve the loss of 214 AUM's of native forage over the life of the mine.

Recreational impacts show that the Continental Divide passes through this tract. Mining and associated surface facilities could have an aesthetic impact upon the Continental Divide National Scenic Trail if it is routed through here.

This tract is in a visual resource Class III management area. Surface mining of approximately 70 acres per year would not meet the management objectives for this classification.

The cultural resource impacts show that three sites have been recorded in this tract. It is estimated that there may be between 17 and 35 additional sites.

The American Indian impacts include 11 known Navajo dwellings:

- a. Six homes on the NW1/4NW1/4, Section 35 T. 20 N., R. 5 W., all on Indian allotted land. Land owners are not known and no consultation on this newly added portion.
- b. Two homes on the NW1/4, Section 34, T. 20 N., R. 5 W., on public land proposed for Navajo Land Exchange.
- c. One home on SE corner of SE1/4, Section 33, T. 20 N., R. 5 W., on public land.
- d. Two homes on the NE1/4, Section 5, T. 19 N., R. 5 W., on public land.

BISTI #1 TRACT
MIXED OWNERSHIP - SURFACE MINE

The Bisti #1 Tract, approximately 3,713 acres in size, is located 35 miles southeast of Farmington, New Mexico. Of the total 3,713 acres for land surface approximately 2,933 acres are unleased Federal, approximately 342 acres are State and approximately 438 acres are private. The acreages for the coal reserves are 3,713 acres unleased Federal.

The tract contains mineable reserves of unleased Federal at 150.0 million tons with the tract total of 150 million tons. The recoverable reserves tonnage of unleased Federal is 127 million tons with the tract total of 127 million tons. The expected production rate would be 3.2 million tons per year for a projected mine life of 42 years. Total expected revenue from federal coal within the tract is \$2.54 billion with an expected federal royalty value of \$318 million for the life of the mine. Approximately 89 surface acres would be disturbed annually for unleased Federal coal. Surface disturbance over the life of the mine would total approximately 3,713 acres for unleased Federal Coal.

Approximately 240 employees would be needed to mine the reserves. The mining activities would require approximately 200 acre feet/year of water from deep wells for reclamation and dust control.

Impacts to ground water would result from destruction of the stratified nature of the Fruitland formation overburden and layers above the Pictured Cliff Sandstone. These would be replaced with crumbled shale and sandstone rubble of a greater porosity. This may result in upward leakage from the underlying Pictured Cliffs Sandstone which contains water of a much greater salinity. There is also a possibility of a lowering of water levels in wells tapping the same aquifers in the vicinity of the tract.

Paleontological resources would be impacted by the disturbance of an estimated 290 fossil localities.

Five cultural resource sites and 43 predicted sites would be destroyed by mining activities.

Surface disturbance on this tract would increase erosion, soil contamination, changing soil characteristics and possible loss or destruction of suitable soils which may occur during overburden removal, stockpiling and reclamation.

Three grazing allotments would be impacted by mining operations. Surface disturbance would cause a loss of 377 AUM's of native forage over the life of the mine. Livestock improvements that would be impacted (destroyed) during mining operations include 1 water well and 3 reservoirs.

Solitude and naturalness in the Bisti WSA would be disrupted by sights and sounds associated with the adjacent surface mining.

BISTI #2 TRACT
MIXED OWNERSHIP - SURFACE MINE

The Bisti #2 Tract, approximately 1,130 acres in size, is located 30 miles south of Farmington, New Mexico. Of the total 1,130 acres for land surface 390 acres are unleased Federal, and 740 acres are private. The acreages for the coal reserves are 1,130 acres unleased Federal.

The tract contains mineable reserves of unleased Federal at 64 million tons with the tract total of 64 million tons. The recoverable reserves tonnage of unleased Federal is 54 million tons with the tract total of 54 million tons. The expected production rate would be 1.5 million tons per year for a projected mine life of 38 years. Total expected revenue from federal coal within the tract is \$1.1 billion with an expected federal royalty value of \$137.5 million for the life of the mine. Approximately 32 surface acres would be disturbed annually for unleased Federal coal. Surface disturbance over the life of the mine would total 1,130 acres for unleased Federal Coal.

Approximately 115 employees would be needed to mine the reserves. The mining activities would require approximately 20 acre feet/year of water from deep wells for reclamation and dust control.

Impacts to ground water would result from destruction of the stratified nature of the Fruitland formation overburden and all confining layers above the Pictured Cliffs Sandstone. These would be replaced with crumbled shale and sandstone rubble of a greater porosity. This may result in upward leakage from the underlying Pictured Cliffs Sandstone which contains water of a much greater salinity. There is also a possibility of a lowering of the water level in wells tapping the same aquifers in the vicinity of the tract. There would be less runoff locally to alluvial channels downstream and possibly less recharge to ground water in the alluvium. Disturbance would include 87 acres of the Hunter Wash floodplain.

Another significant impact to resources is the disturbance of 11 fossil localities per year totaling 274 for the life of the mine.

Solitude and naturalness in the Bisti WSA would be disrupted by sights and sounds associated with the adjacent surface mining. Scenic badlands adjacent to the WSA would be destroyed by mining.

Eight recorded archaeological sites and 12 predicted sites would be destroyed. Two buildings are located on the tract.

Surface disturbance on this tract would increase erosion, soil contamination, changing soil characteristics and possible loss or destruction of suitable soils which may occur during overburden removal, stockpiling and reclamation.

One grazing allotment would be impacted by mining operations. Surface disturbance would cause a loss of 319 AUM's of native forage over the life of the mine.

CATALPA CANYON TRACT MIXED OWNERSHIP - SURFACE MINE

The Catalpa Canyon Tract, approximately 1,040 acres in size, is located 2 to 3 miles southeast of Gallup, New Mexico. The total 1,040 acres of land surface are private. The acreages for the coal reserves are 120 acres unleased Federal and 920 acres for private.

The tract contains mineable reserves of unleased Federal at .4 million tons with the tract total of 8.4 million tons. The recoverable reserves tonnage of unleased Federal is .34 million tons with the tract total of 7.34 million tons. The expected production rate would be 2.5 million tons per year for a projected mine life of 5 years. Total expected revenue from federal coal within the tract is \$6.8 million with an expected federal royalty value of \$.85 million for the life of the mine. Approximately 40 surface acres would be disturbed annually for unleased Federal coal. Surface disturbance over the life of the mine would total 121 acres.

Approximately 8 employees would be needed to mine the reserves. The mining activities would require approximately 35 acre feet/year of water from deep wells for reclamation and dust control.

Impacts to ground water would result from destruction of the stratified nature of Dilco Coal Member of the Crevasse Canyon formation overburden and the confining layers above Gallup Sandstone. Replacement of these formations with crumbled shale and rubble of a greater porosity would result in downward leakage of water from the overlying Crevasse Canyon formation. This water is of a greater salinity than water at this location in the Gallup Sandstone. There is a possibility of lowering water tables and water quality in wells tapping the same aquifers in the vicinity of the tract.

One existing water well within the tract would be destroyed. There would be less runoff locally to alluvial channels downstream and possibly less recharge to ground water in the alluvium.

Surface disturbance on this tract would increase erosion, soil contamination, changing soil characteristics and possible loss or destruction of suitable soils which may occur during overburden removal, stockpiling and reclamation.

A sensitive state plant specie, Astragalus wingtagus, would be impacted by mining the tract. A more intense survey would be necessary to locate all specific habitat areas within the tract.

Two grazing allotments would be impacted by mining operations. Surface disturbance would cause a loss of 18 AUM's of native forage over the life of the mine.

SUNDANCE TRACT MIXED OWNERSHIP - SURFACE MINE

The Sundance Tract, approximately 920 acres in size, is located 5 miles southeast of Gallup, New Mexico. The total 920 acres for land surface are private. The acreages for the coal reserves are 720 acres unleased Federal and 200 acres for private.

The tract contains mineable reserves of unleased Federal at 3.7 million tons with the tract total of 5.0 million tons. The recoverable reserves tonnage of unleased Federal is 3.0 million tons with the tract total of 4.0 million tons. The expected production rate would be 200,000 million tons per year for a projected mine life of 22 years. Total expected revenue from federal coal within the tract is \$62 million with an expected federal royalty value of \$7.75 million for the life of the mine. Approximately 23 surface acres would be disturbed annually. Surface disturbance over the life of the mine would total 458 acres.

Approximately 15 employees would be needed to mine the reserves. The mining activities would require approximately 15 acre feet/year of water from deep wells for reclamation and dust control.

Impacts to ground water would result from destruction of the stratified nature of the Dilco Coal Member of the Crevasse Canyon formation overburden and the confining layers above the Gallup Sandstone. Replacement of these formations with crumbled shale and rubble of a greater porosity would

result in downward leakage of water from the overlying Crevasse Canyon formation. This water is of a greater salinity than water at this location in the Gallup Sandstone. There is a possibility of lowering water tables and water quality in wells tapping the same aquifers in the vicinity of the tract. There would be less runoff locally to alluvial channels downstream and possibly less recharge to ground water in the alluvium.

Another significant impact to resources is the destruction of 17 known archaeological sites and approximately 6 predicted sites. Seven occupied dwellings are scattered throughout the tract.

Surface disturbance on this tract would increase erosion, soil contamination, changing soil characteristics and possible loss or destruction of suitable soils which may occur during overburden removal, stockpiling and reclamation.

One grazing allotment would be impacted by mining operations. Surface disturbance would cause a loss of 56 AUM's of native forage over the life of the mine. Livestock improvements that would be impacted (destroyed) during mining operations include 1 water well and 1.5 miles of fence.

SAMSON LAKE #2 TRACT MIXED OWNERSHIP - SURFACE MINE

The Samson Lake #2 Tract, approximately 2,440 acres in size, is located 9 miles northwest of Gallup, New Mexico. Of the total 2,440 acres for land surface 320 acres are unleased Federal, and 1,280 acres are private. The acreages for the coal reserves are 2,040 acres unleased Federal and 400 acres for private.

The tract contains mineable reserves of unleased Federal at 11 million tons with the tract total of 25 million tons. The recoverable reserves tonnage of unleased Federal is 9 million tons with the tract total of 21 million tons. The expected production rate would be 1.0 million tons per year for a projected mine life of 20 years. Total expected revenue from federal coal within the tract is \$213.4 million with an expected federal royalty value of \$26.68 million for the life of the mine. Approximately 7 surface acres would be disturbed annually. Surface disturbance over the life of the mine would total 140 acres.

Approximately 40 employees would be needed to mine the reserves. The mining activities would require approximately 10 acre feet/year from deep wells for reclamation and dust control.

If good operational procedures such as reduced vehicle speeds and dust controls are practiced by mine operators, the estimated maximum off-site, total suspended particulates (TSP) would be 20 micro grams per cubic meter (ug/m³). The background air quality in the area is estimated at 30 ug/m³. This would give a total of approximately 50 ug/m³. The air quality could exceed the annual New Mexico standard if good operational procedures are not instituted.

Impacts to ground water would result from destruction of the stratified nature of the Dilco Coal Member of the Crevasse Canyon formation overburden and the confining layers above the Gallup Sandstone. Replacement of these formations with crumbled shale and rubble of a greater porosity would result in downward leakage of water from the overlying Crevasse Canyon formation. This water is of a greater salinity than water at this location in the Gallup Sandstone. There is a possibility of lowering water tables and water quality on wells tapping the same aquifers in the vicinity of the tract. One existing water well within the tract would be destroyed. Runoff locally to alluvial channels downstream would be reduced and there would be less recharge to ground water in the alluvium.

Surface disturbance on this tract would increase erosion, soil contamination, changing soil characteristics and possible loss or destruction of suitable soils which may occur during overburden removal, stockpiling, and reclamation.

One cultural site and between 16 and 73 predicted sites would be destroyed by surface mining. Fifteen Navajo dwellings are scattered throughout the tract.

Two grazing allotments would be impacted by mining operations. Surface disturbance would cause a loss of 19 AUM's of native forage over the life of the mine.

LA PLATA #3 TRACT MIXED OWNERSHIP - SURFACE MINE

The La Plata #3 Tract, approximately 240 acres in size, is located 20 miles north of Farmington, New Mexico. Of the total 240 acres for land surface 160 acres are unleased Federal, 40 acres are State and 40 acres are private. The acreages for the coal reserves are 200 acres unleased Federal and 40 acres for State.

The tract contains mineable resources of unleased Federal at 2.0 million tons with the tract total of 5.0 million tons. The recoverable reserves tonnage of unleased Federal is 2.0 million tons with the tract total of 4.0 million tons. The expected production rate would be 0.2 million tons per year for a projected mine life of 24 years. Total expected revenue from federal coal within the tract is \$40 million with an expected federal royalty value of \$5 million for the life of the mine. Approximately 16 surface acres would be disturbed annually. Surface disturbance over the life of the mine would total 160 acres.

Approximately 31 employees would be needed to mine the reserves. The mining activities would require approximately 100 acre feet/year of water from deep wells for reclamation and dust control.

Impacts to ground water would result from destruction of the stratified nature of the Fruitland formation overburden and all confining layers above the Pictured Cliff Sandstone. These would be replaced with crumbled shale and sandstone rubble of a greater porosity. This may result in

upward leakage from the underlying Pictured Cliffs Sandstone which contains water of a much greater salinity. There is also a possibility of a lowering of water levels in wells tapping the same aquifers in the vicinity of the tract. There would be less runoff locally to alluvial channels downstream and possibly less recharge to ground water in the alluvium.

Surface disturbance on this tract would increase erosion, soil contamination, changing soil characteristics and possible loss or destruction of suitable soils which may occur during overburden removal, stockpiling and reclamation.

Approximately 100 acres of the tract are used by wintering mule deer and elk from December 1 through March 31. Mining would result in forced movements of wintering wildlife due to stress.

Three archaeological sites would be destroyed by mining activities. Other sites could exist since less than 4% of the tract has been inventoried.

One grazing allotment would be impacted by mining operations. Surface disturbance would cause a loss of 21 AUM's/year of native forage over the life of the mine.

LA PLATA #4 TRACT
MIXED OWNERSHIP - UNDERGROUND MINE

The La Plata #4 Tract, approximately 600 acres in size, is located 15 miles north of Farmington, New Mexico. Of the total 600 acres for land surface 240 acres are unleased Federal and 360 acres are private. The acreages for the coal reserves are 600 acres unleased Federal.

The tract contains mineable resources of unleased Federal at 15.5 million tons with the tract total of 15.5 million tons. The recoverable resources tonnage of unleased Federal is 10 million tons with the tract total of 10 million tons. The expected production rate would be .50 million tons per year for a projected mine life of 23 years. Total expected revenue from federal coal within the tract is \$252.5 million with an expected federal royalty value of \$20.2 million for the life of the mine. A maximum of 80 surface acres would be disturbed over the life of the underground mine for placement of the related surface facilities.

Approximately 125 employees would be needed to mine the reserves. The mining activities would require approximately 40 acre feet/year of water from deep wells for mining operations.

Impacts to ground water would result from subsidence disrupting overlying bedrock aquifers in the Fruitland formation. Fracturing would cause contamination of aquifers in the alluvial and Fruitland formations. Water utilized in the mining operation would cause a lowering of water levels in wells tapping the same aquifers. Water seepage from the Pictured Cliffs Sandstone into the mine could affect yield and water level in a water well located west of the tract.

A Federal Threatened or Endangered Plant species habitat, Castilleja chromosa, could be impacted by placement of surface facilities. A more intense survey would be necessary to locate all specific habitat areas within the tract.

Five archaeological sites could be damaged or destroyed by mine subsidence. The largest site (LA 5605) is an Anasazi site with at least six room blocks, approximately 500 feet x 3,500 feet.

Two grazing allotments would be impacted by mining operations. Surface disturbance would cause a loss of 4 AUM's of native forage over the life of the mine. One livestock reservoir could be impacted by placement of surface facilities or subsidence.

STAR LAKE EAST #2 (LC) TRACT
MIXED OWNERSHIP - UNDERGROUND MINE

The Star Lake East #2 (LC) Tract, approximately 1,760 acres in size, is located 85 miles south of Farmington, New Mexico. Of the total 1,760 acres for land surface 1,600 acres are unleased Federal and 160 acres are private. The acreages for the coal reserves are 1,760 acres unleased Federal.

The tract contains mineable resources of unleased Federal at 32.0 million tons with the tract total of 32.0 million tons. The recoverable resources tonnage of unleased Federal is 21 million tons with the tract total of 21 million tons. The expected production rate would be 1.0 million tons per year for a projected mine life of 24 years. Total expected revenue from federal coal within the tract is \$517.5 million with an expected federal royalty value of \$41.4 million for the life of the mine. A maximum of 80 surface acres would be disturbed over the life of the underground mine for placement of the related surface facilities.

Approximately 250 employees would be needed to mine the resources. The mining activities would require approximately 71 acre feet/year of water from deep wells for mining operations.

Mine subsidence would fracture overlying bedrock aquifers in the Fruitland and Ojo Alamo Sandstone formations. This would reduce well yields, water levels, and possibly water quality of wells located in the vicinity of the tract.

One dwelling is located within the tract. An area considered by Navajo Indians to be sacred is located within the tract, but no definite boundaries have been established. Placement of surface facilities would impact the sacred area.

Between 15 and 31 archaeological sites have been predicted within the tract. These sites could be damaged or destroyed by placement of surface facilities.

Sights and sounds associated with the mining operation could disrupt the aesthetics along the Continental Divide National Scenic Trail.

One grazing allotment would be impacted by mining operations. Surface disturbance would cause a loss of 7 AUM's of native forage over the life of the mine.

CROWNPOINT NORTHEAST TRACT
MIXED OWNERSHIP - SURFACE MINE

The Crownpoint Northeast Tract, approximately 8,800 acres in size, is located 5 miles northeast of Crownpoint, New Mexico. Of the total 8,800 acres for land surface 560 acres are unleased Federal, 520 acres are State, 4,560 acres are private, and 3,160 acres are withdrawn by Public Land Order 2198 for Indian use. The acreages for the coal reserves are 8,280 acres unleased Federal, and 520 acres for State.

The tract contains mineable reserves of unleased Federal at 150.0 million tons with the tract total of 150.0 million tons. The recoverable reserves tonnage of unleased Federal is 94.0 million tons with the tract total of 94.0 million tons. The expected production rate would be 2.4 million tons per year for a projected mine life of 41 years. Total expected revenue from federal coal within the tract is \$1.88 billion with an expected federal royalty value of \$235 million for the life of the mine. Approximately 206 surface acres would be disturbed annually. Surface disturbance over the life of the mine would total 8,238 acres.

Approximately 285 employees would be needed to mine the reserves. The mining activities would require approximately 125 acre feet/year of water from deep wells for reclamation and dust control.

Air quality would be impacted by an increase in total suspended particulates (TSP) of 29 micro grams per cubic meter (ug/m³). Background air quality in the area is estimated at 30 ug/m³. This would result in a total of 59 ug/m³, with the the annual New Mexico standard being 60 ug/3.

Impacts to ground water would result from the destruction of the stratified nature of the Menefee formation and all confining layers above the Point Lookout Sandstone. These would be replaced by crumbled shale and sandstone rubble of a greater porosity. This may result in upward leakage of water from the underlying Point Lookout Sandstone causing a greater salinity in water of the Menefee formation. There is a possibility of a lowering water levels, well yields, and changes in water quality in wells tapping these formations.

Surface disturbance on this tract would increase erosion, soil contamination, changing soil characteristics and possible loss or destruction of suitable soils which may occur during overburden removal, stockpiling, and reclamation.

Paleontological resources would be impacted by the destruction of three significant fossil sites.

There are 37 dwellings scattered throughout the tract.

No known sites have been found. However predictions of approximately 110 sites have been projected from inventories conducted adjacent to the tract. These sites would be destroyed by mining.

One grazing allotment would be impacted by mining operations. Surface disturbance would cause a loss of 948 AUM's of native forage over the life of the mine. Livestock improvements to be impacted (destroyed) during mining operations include 3 waterwells, 8.5 miles of water pipelines, and 3 livestock reservoirs.

CROWNPOINT EAST TRACT
MIXED OWNERSHIP - SURFACE MINE

The Crownpoint East Tract, approximately 10,640 acres in size, is located 6 miles east of Crownpoint, New Mexico. Of the total 10,640 acres for land surface 160 acres are unleased Federal and 5,620 acres are private, and 4,560 acres are withdrawn by Public Land Order 2198 for Indian use. The acreages for the coal reserves are 9,880 acres unleased Federal and 760 acres for private.

The tract contains mineable reserves of unleased Federal at 149.0 million tons with the tract total of 278.0 million tons. The recoverable reserves tonnage of unleased Federal is 124.0 million tons with the tract total of 129.0 million tons. The expected production rate would be 6.76 million tons per year for a projected mine life of 21 years. Total expected revenue from federal coal within the tract is \$2.47 billion with an expected federal royalty value of \$308 million for the life of the mine. Approximately 261 surface acres would be disturbed annually. Surface disturbance over the life of the mine would total 10,440 acres.

Approximately 216 employees would be needed to mine the reserves. The mining activities would require approximately 250 acre feet/year of water from deep wells for reclamation and dust control.

Air quality would be impacted by an increase in total suspended particulates (TSP) of 46 micro grams per cubic meter (ug/m³). Background air quality in the area is estimated at 30 ug/m³. This would result in a total 76 ug/m³, exceeding the annual New Mexico standard by 16 ug/m³.

Impacts to ground water would result from the destruction of the stratified nature of the Menefee formation and all confining layers above the Point Lookout Sandstone. These would be replaced by crumbled shale and sandstone rubble of a greater porosity. This may result in upward leakage of water from the underlying Point Lookout Sandstone causing a greater salinity in water of the Menefee formation. There is a possibility of a lowering water levels, well yields, and changes in water quality in wells tapping these formations.

Surface disturbance on this tract would increase erosion, soil contamination, changing soils characteristics and possible loss or destruction of suitable soils which may occur during overburden removal, stockpiling, and reclamation.

Paleontological resources would be impacted by the destruction of three recorded fossil sites and any existing potentially important sites.

Sights and sounds associated with the mining operations could disrupt the aesthetics along the Continental Divide National Scenic Trail.

There are 25 dwellings scattered throughout the tract. These dwellings would be destroyed by mining.

One grazing allotment would be impacted by mining operations. Surface disturbance would cause a loss of 1,196 AUM's of native forage over the life of the mine. Livestock improvements to be impacted (destroyed) during mining operations include 1 waterwell, 19.5 miles of fence, and 2 livestock reservoirs.

CHICO WASH SOUTH TRACT
MIXED OWNERSHIP - SURFACE MINE

The Chico Wash South Tract, approximately 12,190 acres in size, is located 30 miles Northeast of Grants, New Mexico. Of the total 12,190 acres for land surface 10,070 acres are unleased Federal, 40 acres are State and 2,080 acres are private. The acreages for the coal reserves are 11,670 acres unleased Federal, 40 acres for State and 480 acres for private.

The tract contains mineable reserves of unleased Federal at 74.0 million tons with the tract total of 80 million tons. The recoverable reserves tonnage of unleased Federal is 63.0 million tons with the tract total of 71.0 million tons. The expected production rate would be 1.8 million tons per year for a projected mine life of 42 years. Total expected revenue from federal coal within the tract is \$1.31 billion with an expected federal royalty value of \$164 million for the life of the mine. Approximately 148 surface acres would be disturbed annually. Surface disturbance over the life of the mine would total 5,907 acres.

Approximately 120 employees would be needed to mine the reserves. The mining activities would require approximately 400 acre feet/year of water from deep wells for reclamation and dust control.

Air quality would be impacted by an increase in total suspended particles (TSP) of 23 micro grams per cubic meter (ug/m³). Background air quality in the area is estimated at 30 ug/m³. This would result in a total of 53 ug/m³, with the annual New Mexico standard being 60 ug/m³.

Impacts to ground water would result from destruction of the Menefee formation (Cleary Coal Member) overburden and confining layers above the Point Lookout Sandstone. Leakage of poorer quality water from the overlying Menefee

into the Point Lookout Sandstone would occur. The Point Lookout aquifer is of particular significance because of the high chemical quality of water and importance as a major aquifer for the San Juan Basin. One BLM water well and one private well located within the tract would be destroyed. Two BLM wells tapping the Point Lookout Sandstone and one BLM well tapping the Gallup Sandstone aquifer would be impacted by reduction of well yields, lowering of water levels, and possible changes in water quality. Eight springs within the tract would be destroyed by mining since water originates in the Cleary Coal Member of the Menefee formation. Two of these springs, Ojo Azabache and Coal Spring have been declared as Public Water Reserves. Arroyo Chico is a perennial stream due to discharge of uranium mine water from the San Mateo area. The stream flow of 3 to 4 cubic feet per second would be difficult to impound or divert and erosion would increase after reclamation.

An interesting historical site, Azabache Station, that provides historical sightseeing opportunities would be destroyed by mining operations. Four archaeological sites that have been recorded within the tract would be destroyed.

Surface disturbance on this tract would increase erosion, soil contamination, changing soil characteristics and possible loss or destruction of suitable soils which may occur during overburden removal, stockpiling, and reclamation.

One grazing allotment would be impacted by mining operation. Surface disturbance would cause a loss of 925 AUM's of native forage over the life of the mine. Livestock improvements to be impacted (destroyed) during mining operations include three waterwells, 10.5 miles of fence, and five livestock reservoirs.

TA-HA-BAH WELL TRACT
MIXED OWNERSHIP - UNDERGROUND MINE

The Ta-Ha-Bah Well Tract, approximately 3,080 acres in size, is located 6 miles south of Gallup, New Mexico. The total 3,080 acres for land surface are private. The acreages for the coal reserves are 3,080 acres unleased Federal.

The tract contains mineable reserves of unleased Federal at 23 million tons with the tract total of 23 million tons. The recoverable reserves tonnage of unleased Federal is 12 million tons with the tract total of 12 million tons. The expected production rate would be .7 million tons per year for a projected mine life of 13 years. Total expected revenue from federal coal within the tract is \$352.5 million with an expected federal royalty value of \$28.2 million for the life of the mine. A maximum of 80 surface acres would be disturbed over the life of the underground mine for placement of the related surface facilities.

Approximately 175 employees would be needed to mine the reserves. The mining activities would require approximately 40 acre feet per year of water from deep wells for mining operations.

Mine subsidence would fracture overlying bedrock aquifers in the Crevasse Canyon formation. This would reduce well yields, water levels, and possibly water quality of wells located in the vicinity of the tract. Two known wells exist within the tract. Mine subsidence and/or dewatering would affect the quantity and quality of water available to these and other wells in the vicinity.

No known archaeological sites have been recorded within the tract, however, projections of inventories conducted near the tract indicate approximately 67 predicted sites could exist. The sites could be destroyed by placement of surface facilities or fractured by mine subsidence.

There are 21 dwellings scattered throughout the tract. Mine subsidence could create safety hazards and damage to dwellings.

Two grazing allotments would be impacted by mining operations. Surface disturbance would cause a loss of 9 AUM's of native forage over the life of the mine.

HOGBACK TRACT MIXED OWNERSHIP - SURFACE MINE

The Hogback Tract, approximately 1,760 acres in size, is located 4 miles southeast of Gallup, New Mexico. Of the total 1,760 acres for land surface 360 acres are unleased Federal and 1,400 acres are private. The acreages for the coal reserves are 1,760 acres unleased Federal.

The tract contains mineable reserves of unleased Federal at 5.0 million tons with the tract total of 5.0 million tons. The recoverable reserves tonnage of unleased Federal is 4.0 million tons with the tract total of 4.0 million tons. The expected production rate would be 200,000 million tons per year for a projected mine life of 23 years. Total expected revenue from federal coal within the tract is \$86 million with an expected federal royalty value of \$10.8 million for the life of the mine. Approximately 43 surface acres would be disturbed annually. Surface disturbance over the life of the mine would total 898 acres.

Approximately 15 employees would be needed to mine the reserves. The mining activities would require approximately 30 acre feet/year of water from deep wells for reclamation and dust control.

Impacts to ground water would result from destruction of the stratified nature of the Dilco Coal Member of the Crevasse Canyon formation overburden and the confining layers above the Gallup Sandstone. Replacement of these formations with crumbled shale and rubble of a greater porosity would result in downward leakage of water from the overlying Crevasse Canyon formation. This water is of a greater salinity than water at this location in the Gallup Sandstone. There is a possibility of lowering water tables and water quality in wells tapping the same aquifers in the vicinity of the tract. One existing water well within the tract would be destroyed. There would be less runoff locally to alluvial channels downstream and possibly less recharge to ground water in the alluvium.

Surface disturbance on this tract would increase erosion. Soil contamination, changing soil characteristics and possible loss or destruction of suitable soils which may occur during overburden removal, stockpiling and reclamation.

No archeological sites are known to have been recorded in the tract; however, approximately 39 sites have been predicted from inventoried conducted near the tract. These sites would be destroyed by mining.

A federal listed Threatened and Endangered plant species, Astragalus wingatus, may occur within the tract according to a township survey of possible occurrence. If present his specie would be destroyed.

Seventeen dwellings and one developed trailer park are located within the tract. The trailer park is located in the extreme northwestern portion of the tract and could be dropped from lease consideration without affecting access to the trailer park. Fourteen of the 17 homes are concentrated in SW1/4 of Section 19, T. 15 N., R. 18 W., NMPM. The SW1/4 of Section 19 is the only portion of Section 19 that was delineated as the tract and could possibly be dropped from lease consideration.

Two grazing allotments would be impacted by mining operations. Surface disturbance would cause a loss of 107 AUM's of native forage over the life of the mine.

TWIN BUTTES TRACT
MIXED OWNERSHIP - SURFACE MINE

The Twin Buttes Tract, approximately 8,800 acres in size, is located 6 miles southwest of Gallup, New Mexico. Of the total 8,800 acres for land surface 320 acres are unleased Federal and 4,790 acres are private, and 3,690 acres are withdrawn by Public Land Order 2198 for Indian Use. The acreages for the coal reserves are 8,640 acres unleased Federal and 160 acres for private.

The tract contains mineable reserves of unleased Federal at 35.0 million tons with the tract total of 68.0 million tons. The recoverable reserves tonnage of unleased Federal is 29.7 million tons with the tract total of 30.0 million tons. The expected production rate would be 1.0 million tons per year for a projected mine life of 22 years. Total expected revenue from federal coal within the tract is \$574 million with an expected federal royalty value of \$71.8 million for the life of the mine. Approximately 250 surface acres would be disturbed annually. Surface disturbance over the life of the mine would total 5,000 acres.

Approximately 75 employees would be needed to mine the reserves. The mining activities would require approximately 150 acre feet/year of water from deep wells for reclamation and dust control.

Air quality would be impacted by an increase in total suspended particulates (TSP) of 30 micro grams per cubic meter (ug/m3). Background

air quality in the area is estimated at 30 ug/m³. This would result in a total of 60 ug/m³ reaching the annual New Mexico standard of 60 ug/m³.

Impacts to ground water would result from destruction of the stratified nature of the Dilco Coal Member of the Crevasse Canyon formation overburden and the confining layers above the Gallup Sandstone. Replacement of these formations with crumbled shale and rubble of a greater porosity would result in downward leakage of water from the overlying Crevasse Canyon formation. This water is of a greater salinity than water at this location in the Gallup Sandstone. There is a possibility of lowering water tables and water quality in wells tapping the same aquifers in the vicinity of the tract. Four existing water wells within the tract would be destroyed. There would be less runoff locally to alluvial channels downstream and possibly less recharge to ground water in the alluvium.

Surface disturbance on this tract would increase erosion, soil contamination, changing soil characteristics and possible loss or destruction of suitable soils which may occur during overburden removal, stockpiling and reclamation.

There are 19 recorded fossil localities within the tract with a potential for discovery of important material discoveries in these exposures.

No known archaeological sites have been recorded; however, one petroglyph site exists and 234 archaeological sites have been predicted within the tract. These sites would be destroyed by mining.

There are 93 dwellings scattered through out this tract. These dwellings would be destroyed by mining and relocation would be necessary.

Two grazing allotments would be impacted by mining operations. Surface disturbance would cause a loss of 584 AUM's of native forage over the life of the mine. Livestock improvements that would be impacted (destroyed) during mining operations include 1 water well and 2.5 miles of water pipeline.

PINEHAVEN TRACT MIXED OWNERSHIP - SURFACE MINE

The Pinehaven Tract, approximately 20,400 acres in size, is located 18 miles south of Gallup, New Mexico. Of the total 20,400 acres for land surface 1,120 acres are State and 19,280 acres are private. The acreages for the coal reserves are 9,680 acres unleased Federal, 1,120 acres for State and 9,600 acres for private.

The tract contains mineable reserves of unleased Federal at 7 million tons with the tract total of 7 million tons. The recoverable reserves tonnage of unleased Federal is 6 million tons with the tract total of 6 million tons. The expected production rate would be .315 million tons per year for a projected mine life of 23 years. Total expected revenue from federal coal within the tract is \$126 million with an expected federal royalty value of

\$15.75 million for the life of the mine. Approximately 29 surface acres would be disturbed annually for unleased Federal coal. Surface disturbance over the life of the mine would total 588 acres for unleased Federal Coal.

Approximately 24 employees would be needed to mine the reserves. The mining activities would require approximately 20 acre feet/year of water from deep wells for reclamation and dust control.

Impacts to ground water would result from destruction of the stratified nature of the Dilco Coal Member of the Crevasse Canyon formation overburden and the confining layers above the Gallup Sandstone. Replacement of these formations with crumbled shale and rubble of a greater porosity would result in downward leakage of water from the overlying Crevasse Canyon formation. This water is of a greater salinity than water at this location in the Gallup Sandstone. There is a possibility of lowering water tables and water quality in wells tapping the same aquifers in the vicinity of the tract. Seven existing water wells within the tract would be destroyed. There would be less runoff locally to alluvial channels downstream and possibly less recharge to groundwater in the alluvium.

Surface disturbance on this tract would increase erosion, soil contamination, changing soil characteristics and possible loss or destruction of suitable soils which may occur during overburden removal, stockpiling and reclamation.

Nineteen recorded archaeological sites and 191 predicted sites would be destroyed by mining.

There are 107 dwellings located within the tract. Fifty dwellings are located on Navajo Tribal land of Section 16, T. 13 N., R. 17 W., NMPM. Section 16 is located in the extreme northeastern edge of the tract, with only the south boundary adjacent to the remainder of the tract. If this section is dropped from lease consideration, nearly 50% of the homes within this tract would not be relocated. The remaining 57 dwellings are scattered throughout the tract.

One grazing allotment would be impacted by mining operations. Surface disturbance would cause a loss of 72 AUM's of native forage over the life of the mine.

BREAD SPRINGS #1 TRACT
MIXED OWNERSHIP - SURFACE MINE

The Bread Springs #1 Tract, approximately 1,116 acres in size, is located 7 miles southeast of Gallup, New Mexico. Of the total 1,116 acres for land surface 160 acres are State and 956 acres are private. The acreages for the coal reserves are 636 acres unleased Federal, 160 acres for State and 320 acres for private.

The tract contains mineable reserves of unleased Federal at .85 million tons with the tract total of 1.61 million tons. The recoverable

reserves tonnage of unleased Federal is .7 million tons with the tract total of 1.37 million tons. The expected production rate would be .034 million tons per year for a projected mine life of 21 years. Total expected revenue from federal coal within the tract is \$14 million with an expected federal royalty value of \$1.8 million for the life of the mine. Approximately 5.9 surface acres would be disturbed annually. Surface disturbance over the life of the mine would total 118 acres.

Approximately 3 employees would be needed to mine the reserves. The mining activities would require approximately 20 acre feet/year of water from deep wells for reclamation and dust control.

Impacts to ground water would result from destruction of the stratified nature of the Dilco Coal Member of the Crevasse Canyon formation overburden and the confining layers above the Gallup Sandstone. Replacement of these formations with crumbled shale and rubble of a greater porosity would result in downward leakage of water from the overlying Crevasse Canyon formation. This water is of a greater salinity than water at this location in the Gallup Sandstone. There is a possibility of lowering water tables and water quality in wells tapping the same aquifers in the vicinity of the tract.

Surface disturbance on this tract would increase erosion, soil contamination, changing soil characteristics and possible loss or destruction of suitable soils which may occur during overburden removal, stockpiling and reclamation.

No paleontological data is available on the tract, however, surveys on adjacent lands produced over 30 fossil sites. Several of these sites are highly significant since the Crevasse Canyon fossils are rare and unstudied. Potentially significant fossils would be destroyed by mining this tract.

No known archaeological sites exist within the tract, however, approximately 16 predicted sites would be destroyed by mining.

There are 17 dwellings scattered throughout the tract that would have to be relocated.

One grazing allotment would be impacted by mining operations. Surface disturbance would cause a loss of 19 AUM's of native forage over the life of the mine.

BREADSPRINGS #2 TRACT
MIXED OWNERSHIP - UNDERGROUND MINE

The Bread Springs #2 Tract, approximately 1,040 acres in size, is located 7 miles southeast of Gallup, New Mexico. The total 1,040 acres of land surface are private. The acreages for the coal reserves are 1,040 acres unleased Federal.

The tract contains mineable reserves of unleased Federal at 10 million tons with the tract total of 12 million tons. The recoverable reserves

tonnage of unleased Federal is 5 million tons with the tract total of 7 million tons. The expected production rate would be .14 million tons per year for a projected mine life of 50 years. Total expected revenue from federal coal within the tract is \$135 million with an expected federal royalty value of \$1.08 million for the life of the mine. A maximum of 80 surface acres would be disturbed over the life of the underground mine for placement of the related surface facilities.

Approximately 27 mining employees would be needed to mine the reserves. The mining activities would require approximately 30 acre feet/year of water from deep wells for mining operations.

Impacts to ground water would result from subsidence fracturing overlying bedrock aquifers in the Crevasse Canyon formation. Utilization of water for mine operations and formation fracturing could reduce water yields, levels, and water quality in wells tapping the Crevasse Canyon aquifer.

No paleontological data is available on the tract, however, surveys on adjacent lands produced over 30 fossil sites. Several of these sites are highly significant since the Crevasse Canyon fossils are rare and unstudied. Potentially significant fossils would be destroyed by mining this tract.

No known archaeological sites exist within the tract, however, approximately 27 predicted sites would be destroyed by mining.

One grazing allotment would be impacted by mining operations. Surface disturbance would cause a loss of 9 AUM's of native forage over the life of the mine.

GAMERCO #1 (LC) TRACT
MIXED OWNERSHIP - SURFACE MINE

The Gamerco #1 (LC) Tract, approximately 320 acres in size, is located 9 miles northwest of Gallup, New Mexico. Of the total 2,440 acres for land surface 320 acres are unleased Federal and 320 acres are private. The acreages for the coal reserves are 160 acres unleased Federal and 160 acres for private.

The tract contains mineable reserves of unleased Federal at 2.3 million tons with the tract total of 3.6 million tons. The recoverable reserves tonnage of unleased Federal is 1.9 million tons with the tract total of 3.1 million tons. The expected production rate would be 95,000 tons per year for a projected mine life of 20 years. Total expected revenue from federal coal within the tract is \$38 million with an expected federal royalty value of \$4.75 million for the life of the mine. Approximately 4 surface acres would be disturbed annually. Surface disturbance over the life of the mine would total 75 acres.

Approximately 10 employees would be needed to mine the reserves. The mining activities would require approximately 15 acre feet/year of water from deep wells for reclamation and dust control.

Impacts to ground water would result from destruction of the stratified nature of the Dilco Coal Member of the Crevasse Canyon formation overburden and the confining layers above the Gallup Sandstone. Replacement of these formations with crumbled shale and rubble of a greater porosity would result in downward leakage of water from the overlying Crevasse Canyon formation. This water is of a greater salinity than water at this location in the Gallup Sandstone. There is a possibility of lowering water tables and water quality in wells tapping the same aquifers in the vicinity of the tract. There would be less runoff locally to alluvial channels downstream and possibly less recharge to ground water in the alluvium.

Surface disturbance on this tract would increase erosion, soil contamination, changing soil characteristics and possible loss or destruction of suitable soils which may occur during overburden removal, stockpiling and reclamation.

No known archaeological sites have been recorded, but 13 predicted sites would be destroyed by mining.

Two dwellings are located within the tract and would have to be relocated.

Two grazing allotments would be impacted by mining operations. Surface disturbance would cause a loss of 13 AUM's of native forage over the life of the mine.

GAMERCO #2 (LC) TRACT
MIXED OWNERSHIP - UNDERGROUND MINE

The Gamerco #2 (LC) Tract, approximately 4,480 acres in size, is located 9 miles northwest of Gallup, New Mexico. Of the total 4,480 acres for land surface 40 acres are unleased Federal, 160 acres are State and 4,280 acres are private. The acreages for the coal reserves are 2,120 acres unleased Federal, 160 acres for State and 2,200 acres for private.

The tract contains mineable reserves of unleased Federal at 16.6 million tons with the tract total of 35.4 million tons. The recoverable reserves tonnage of unleased Federal is 8.3 million tons with the tract total of 17.7 million tons. The expected production rate would be .83 million tons per year for a projected mine life of 13 years. Total expected revenue from federal coal within the tract is \$415 million with an expected federal royalty value of \$33.2 million for the life of the mine. A maximum of 80 surface acres would be disturbed over the life of the underground mine for placement of the related surface facilities.

Approximately 208 mining employees would be needed to mine the reserves. The mining activities would require approximately 145 acre feet/year of water from deep wells for mining operations.

Impacts to ground water would result from subsidence fracturing the Crevasse Canyon and Menefee formations. Water utilized in the mining

operation and subsidence would cause reduced well yields, water levels, and water quality in wells tapping the Crevasse Canyon and Menefee formations.

No archaeological sites are known to have been recorded in the tract, however, between 17 and 76 sites have been predicted from inventories conducted near the tract. These sites would be destroyed by mining.

Thirty five dwellings are located within the tract and would have to be relocated to avoid the possibility of subsidence damage.

Two grazing allotments would be impacted by mining operations. Surface disturbance would cause a loss of 9 AUM's of native forage over the life of the mine.

SAMSON LAKE #1 (LC) TRACT
MIXED OWNERSHIP - UNDERGROUND MINE

The Samson Lake #1 (LC) Tract, approximately 5,600 acres in size, is located 9 miles east-northeast of Gallup, New Mexico. Of the total 5,600 acres for land surface 680 acres are unleased Federal, 80 acres are State and 4,840 acres are private. The acreages for the coal reserves are 4,080 acres unleased Federal, 80 acres for State and 1,440 acres for private.

The tract contains mineable reserves of unleased Federal at 26 million tons with the tract total of 26 million tons. The recoverable reserves tonnage of unleased Federal is 8 million tons with the tract total of 17 million tons. The expected production rate would be 700,000 tons per year for a projected mine life of 23 years. Total expected revenue from federal coal within the tract is \$350 million with an expected federal royalty value of \$28 million for the life of the mine. A maximum of 80 surface acres would be disturbed over the life of the underground mine for placement of the related surface facilities.

Approximately 175 employees would be needed to mine the reserves. The mining activities would require approximately 45 acre feet/year of water from deep wells for mining operations.

Impacts to ground water would result from subsidence fracturing the Crevasse Canyon and Menefee formations. Water utilized in the mining operation and subsidence would cause reduced well yields, water levels, and water quality in wells tapping the Crevasse Canyon and Menefee formations. Three known wells located within the tract are completed to the Gallup Sandstone formation. If dewatering of the mine is necessary, the yields and water levels of these wells and water wells outside the tract would be reduced.

One recorded archaeological site and up to 147 predicted sites would be destroyed or damaged by surface facilities or subsidence.

There are 33 dwellings that would have to be relocated to avoid safety hazards or damage to homes due to subsidence,

One grazing allotment would be impacted by mining operations. Surface disturbance would cause a loss of 9 AUM's of native forage over the life of the mine.

PRLA #NM-585 (UNITED ELECTRIC)
MIXED OWNERSHIP - SURFACE MINE

PRLA Number NM-585 (United Electric) is approximately 2,811 acres in size and is located approximately 70 miles southwest of Farmington, New Mexico. Of the total 2,811 acres of land surface, 2,048 acres are Federal and 763 acres are Indian. Approximately 1,825 acres of surface disturbance would result from mining.

Approximately 200 employees would be needed to mine the reserves. The mining activities would require approximately 100 acre feet/year of water from deep wells for reclamation and dust control.

Surface disturbance on this tract would increase erosion, soil contamination, changing soil characteristics and possible loss or destruction of suitable soils which may occur during overburden removal, stockpiling, and reclamation.

The ground water impacts include the following:

1. Destruction of stratified nature of Fruitland Formation overburden and all confining layers above the Pictured Cliffs Sandstone. These would be replaced with crumbled shale and sandstone rubble having a greater porosity than the original stratified material. This may result in upward leakage from the underlying Pictured Cliffs Sandstone which contains water of a much greater salinity than the water in the Fruitland Formation at some locations.
2. Possible offsite reduction of well yields, lowering of water levels, and changes in water quality in wells tapping the Quaternary Alluvium, Fruitland Formation, and Pictured Cliffs Sandstone.

Impacts to the range resources would involve the loss of 203 AUMs of native forage (grazing allotment #6023) over the life of the mine.

Cultural resources that would be impacted include 22 sites that are eligible for National Register, one site pending National Register determination and 10 additional sites predicted to occur.

Portions of the Continental Divide National Scenic Trail study corridor traverse the lease application area. The actual trail has not yet been established, but could be affected by mining.

There are three powerline rights-of-way (9.78 acres), one natural gas pipeline right-of-way (7.92 acres), one telephone line and pipeline rights-of-way (13.5 acres) and one natural gas pipeline application for right-of-way (10.33 acres) which occur on the PRLA and may be adversely affected by mining activities. In addition, BIA public road 47-A also crosses the PRLA (4.22 acres) and may be impacted.

Navajo occupancies on this PRLA include seven residences. There are no reported Navajo gravesites or sacred sites located on this PRLA.

PRLA #NM-3752 (ARCH MINERALS)
MIXED OWNERSHIP - SURFACE MINE

PRLA Number NM-3752 (Arch Minerals) approximately 3760 acres in size, is located 35 miles south of Farmington, New Mexico. Of the total 3760 acres of land surface, 3085 acres are Federal, 515 acres are Indian, and 160 acres are Indian withdrawal.

Approximately 185 employees would be needed to mine the reserves in this PRLA in conjunction with two others in Arch Minerals Unit 1 requiring 400 employees. The mining activities would require 200 acre feet/year of water from deep wells for reclamation and dust control.

Impacts to ground water would result from destruction of the stratified nature of the Fruitland Formation overburden and layers above the Pictured Cliffs Sandstone. These would be replaced with crumbled shale and sandstone rubble of a greater porosity. This may result in upward leakage from the underlying Pictured Cliffs Sandstone which contains water of a much greater salinity. There is also a possibility of a lowering of water levels in wells tapping the same aquifers in the vicinity of the tract.

Part of this PRLA lies within the Fossil Forest, an area of special paleontological value. Current proposals would not allow mining in this area for up to a ten year period of scientific study.

Paleontological resources would be impacted by the disturbance of an estimated 184 fossil localities.

Twenty-three cultural resource sites and 37 predicted sites would be destroyed by mining. Also, 2.3 kilometers projected segments of Chacoan roads would be destroyed.

Surface disturbance on this tract would increase erosion, soil contamination, changing soil characteristics and possible loss or destruction of suitable soils which may occur during overburden removal, stockpiling and reclamation.

Three grazing allotments would be impacted by mining operations. Surface disturbance would cause a loss of 341 AUMs/year of native forage over the life of the mine.

The proposed Star Lake Railroad right-of-way passes through part of the lease. Approximately 15 acres of the right-of-way would be destroyed along a 3,516 foot corridor.

Land use proposals on this lease would include 650 acres as part of the Ute Mountain Exchange Withdrawal. This acreage would be impacted until reclamation.

In addition to the proposed Star Lake Railroad one county road (San Juan County) totalling 7,300 feet would be destroyed until reclamation.

San Juan County Road #C-15 (10.06 acres) traverses this PRLA. Relocation of the road may be necessary due to mining activities.

PRLA #NM-3753 (ARCH MINERALS)
MIXED OWNERSHIP - SURFACE MINE

PRLA Number NM-3753 (Arch Minerals) approximately 2,951 acres in size, is located 35 miles south of Farmington, New Mexico. Of the total 2,951 acres of land surface, 1,159 are Federal, 672 are state, 800 acres are Indian, and 320 acres are private.

Approximately 135 employees would be needed to mine the reserves in this PRLA in conjunction with two others in Arch Minerals Unit 1 requiring 400 employees. Mining activities would require 200 acre feet/year of water from deep wells for reclamation and dust control.

Impacts to ground water would result from destruction of the stratified nature of the Fruitland Formation overburden and layers above the Pictured Cliffs Sandstone. These would be replaced with crumbled shale and sandstone rubble of a greater porosity. This may result in upward leakage from the underlying Pictured Cliffs Sandstone which contains water of a much greater salinity. There is also a possibility of a lowering of water levels in wells tapping the same aquifers in the vicinity of the tract.

Approximately 199 paleontological sites would be destroyed by mining.

Part of this PRLA lies within the Fossil Forest, an area of special paleontological value. Current proposals would not allow mining in this area for up to a ten year period of scientific study.

Ninety predicted cultural resource sites would be destroyed by mining.

Surface disturbance on this tract would increase erosion, soil contamination, changing soil characteristics and possible loss or destruction of suitable soils which may occur during overburden removal, stockpiling and reclamation.

Two grazing allotments would be impacted by mining operations. Surface disturbance would cause a loss of 240 AUMs/year of native forage over the life of the mine.

One San Juan County Road #E-15 (12.26 acres) totalling 8,900 feet would be destroyed by surface mining or relocated.

The floodplains on this tract that would be impacted are:

De-na-zin Wash Tributary - 115 acres
Coal Creek - 75 acres

PRLA #NM-3754 (ARCH MINERALS)
MIXED OWNERSHIP - SURFACE MINE

PRLA Number NM-3754 (Arch Minerals), approximately 3,075 acres in size, is located 35 miles south of Farmington, New Mexico. Of the 3,075 acres of land surface, 1,555 acres are Federal and 1,520 are Indian withdrawal.

Approximately 80 employees would be needed to mine the reserves in this PRLA in conjunction with two others in Arch Minerals Unit 1 requiring 400 employees. The mining activities would require 35 acre feet/year of water from deep wells for reclamation and dust control.

Impacts to ground water would result from destruction of the stratified nature of the Fruitland Formation overburden and layers above the Pictured Cliffs Sandstone. These would be replaced with crumbled shale and sandstone rubble of a greater porosity. This may result in upward leakage from the underlying Pictured Cliffs Sandstone which contains water of a much greater salinity. There is also a possibility of a lowering of water levels in wells tapping the same aquifers in the vicinity of the tract.

Paleontological resources would be impacted by the disturbance of an estimated 42 fossil localities.

Two cultural sites and 40 predicted cultural sites would be destroyed by mining.

Surface disturbance on this tract would increase erosion, soil contamination, changing soil characteristics and possible loss or destruction of suitable soils which may occur during overburden removal, stockpiling and reclamation.

One grazing allotment would be impacted by mining operations. Surface disturbance would cause a loss of 224 AUMs/year of native forage over the life of the mine.

The proposed Star Lake Railroad right-of-way passes through part of the lease. Approximately 23.25 acres of the right-of-way would be destroyed along a 6,332 foot corridor. A powerline totalling (.83 acres) 1,800 feet also crosses the PRLA and would be impacted by mining.

Land use proposals on this lease would include 640 acres as part of the Ute Mountain Exchange withdrawal. This acreage would be impacted until reclamation.

Part of the PRLA lies within the Fossil Forest, an area of special paleontological value. Current proposals would not allow mining in this area for up to a ten year period of scientific study.

This PRLA is crossed by State Road 371 (2.62 acres) and San Juan County Road E-4 (.28 acres). Relocation of the roads may be necessary due to mining activities.

PRLA #NM-3755 (ARCH MINERALS)
MIXED OWNERSHIP - SURFACE MINE

PRLA Number NM-3755 (Arch Minerals), approximately 2,588 acres in size, is located 35 miles south of Farmington, New Mexico. Of the total 2,588 acres of land surface, 1,468 acres are Federal and 1,120 acres are Indian surface.

Approximately 80 employees would be needed to mine the reserves in this PRLA in conjunction with three others in Arch Minerals Unit 2 requiring 400 employees. The mining activities would require 78 acre feet/year of water from deep wells for reclamation and dust control.

Impacts to ground water would result from destruction of the stratified nature of the Fruitland Formation overburden and layers above the Pictured Cliffs Sandstone. These would be replaced with crumbled shale and sandstone rubble of a greater porosity. This may result in upward leakage from the underlying Pictured Cliffs Sandstone which contains water of a much greater salinity. There is also a possibility of a lowering of water levels in wells tapping the same aquifers in the vicinity of the tract.

Floodplains that would be affected are:

- Tsaya Canyon Tributary 82 acres
- Ah-shi-sle-pah Wash 90 acres
- Ah-shi-sle-pah Tributary 42 acres

Paleontological resources would be impacted by the disturbance of an estimated two fossil locations.

Fifteen cultural sites would be destroyed by mining. Also 0.10 kilometer of imaged segments and 1.50 kilometer of projected segments of the Chacoan road system would be impacted.

This tract overlaps with an area under Visual Resources Management Class II. Visual qualities of area would be impaired from mining activities.

Surface disturbance on this tract would increase erosion, soil contamination, changing soil characteristics and possible loss or destruction of suitable soils which may occur during overburden removal, stockpiling and reclamation.

Three grazing allotments would be impacted by mining operations. Surface disturbance would cause a loss of 268 AUMs/year of native forage over the life of the mine.

One powerline right-of-way (6.31 acres) totaling 5,500 feet would be impacted by surface mining.

One San Juan County Road #A-01 (3.72 acres) approximately 2,700 long would be destroyed by mining.

One Navajo sacred offering point is located on Federal land within the PRLA.

PRLA #NM-3834 (EASTERN ASSOCIATION PROPERTIES CORPORATION)
MIXED OWNERSHIP - UNDERGROUND MINE

PRLA Number NM-3834 (Eastern Assoc. Properties Corp.) is approximately 4,804 acres and is located about 30 miles south of Farmington, New Mexico. Of the total 4,804 acres for land surface, 4,591 acres are Federal and 213 are Indian.

Ground water impacts may include:

1. Subsidence may disrupt overlying bedrock aquifer(s) in the Ojo Alamo Sandstone and Nacimiento Formation for fracturing them. This would affect well yields, water levels and possibly water quality in wells tapping those aquifers.
2. Subsidence may disrupt alluvial aquifer and affect well yields, water levels, and possibly quality in wells tapping those aquifers.
3. Approximately 100 acre-feet per year of ground water from "deep" aquifer(s) for dust suppression and reclamation would alter ground water flow near the well(s) and could cause a lowering of water levels in wells tapping the same aquifer(s) in the vicinity of the tract.
4. Approximately 720 acres of Alamo Wash and Willow Wash flood plain acreage are in this PRLA.

Mining may impact a portion of the 40 recorded paleontological resources. Cultural resources may also be impacted but no survey data is available to predict how many sites may be disturbed.

This PRLA overlaps 4,591 acres of the De-na-zin WSA and is completely within the Bisti/De-na-zin ACEC.

The majority of this PRLA is within a Class II management area for visual resources. A small portion of the southeastern corner is within a Class IV management area.

One hundred and sixty acres has been found unsuitable because of a prairie falcon nest and 230 acres are unsuitable because of a ferruginous hawk nest.

Grazing Allotment #6008 and #6010 may be affected by the mining activities. Native vegetation would be destroyed for surface facilities.

PRLA #NM-3835 (EASTERN ASSOCIATION PROPERTIES CORPORATION)
MIXED OWNERSHIP - SURFACE MINE

PRLA Number NM-3835 (Eastern Assoc. Properties Corp.) is approximately 4,500 acres and located about 36 miles south of Farmington, New Mexico. Of the total 4,500 acres of land surface, 1,325 are Federal, 2,215 are state, and 960 are Indian.

Mining of this PRLA will be in conjunction with four other PRLA's and one existing lease, providing employment for a total of 250 people.

Surface disturbance in this PRLA would increase erosion and soil contamination, and result in the change of soil characteristics and possible loss or destruction of suitable soils which may occur during overburden removal, stockpiling and reclamation.

Impacts to ground water would result from destruction of the stratified nature of the Fruitland Formation overburden and layers above the Pictured Cliffs Sandstone. These would be replaced with crumbled shale and sandstone rubble of a greater porosity. This could result in upward leakage from the underlying Pictured Cliffs Sandstone which contains water of a much greater salinity. There is also a possibility of a lowering of water levels in wells tapping the same aquifers in the vicinity of the PRLA. In addition, approximately 245 acres of floodplain may be disrupted within this PRLA.

Mining would adversely affect 28 predicted cultural sites, 2 sites which are eligible for inclusion in the National Register, and a projected 1.75 kilometers of the Chacoan Road system. There is no inventory data for the paleontological resources in this PRLA.

One grazing allotment (#6010) in this PRLA would be adversely affected by the disturbance of 3,380 acres resulting in the loss of 344 AUMs.

A public road, San Juan County C-15 crosses 6,000 feet of this PRLA.

PRLA #NM-3836 (EASTERN ASSOCIATION PROPERTIES CORPORATION)
MIXED OWNERSHIP - SURFACE AND UNDERGROUND MINE

PRLA Number NM-3836 (Eastern Assoc. Properties Corp.) is approximately 5,110 acres and located about 38 miles south of Farmington, New Mexico. Of the total 5,110 acres of land surface, 3,830 acres are Federal, and 1,280 acres are state.

Mining of this PRLA would be in conjunction with four other PRLA's and one existing lease providing employment for a total of 250 people.

Surface disturbance of 1,910 acres on this PRLA would increase erosion and soil contamination, and result in the change of soil characteristics and possible loss or destruction of suitable soils which may occur during overburden removal, stockpiling and reclamation.

Impacts to ground water would result from destruction of the stratified nature of the Fruitland Formation overburden and layers above the Pictured Cliffs Sandstone. These would be replaced with crumbled shale and sandstone rubble of a greater porosity. This could result in upward leakage from the underlying Pictured Cliffs Sandstone which contains water of a much greater salinity. There is also a possibility of a lowering of water levels in wells tapping the same aquifers in the vicinity of the PRLA. In addition, approximately 455 acres of floodplain may be disrupted within this PRLA.

The following impacts may occur to ground water as a result of underground mining 3200 acres of this PRLA:

1. Subsidence may disrupt overlying bedrock aquifer(s) in the Ojo Alamo Sandstone and Nacimiento Formation for fracturing them. This would affect well yields, water levels and possibly water quality in wells tapping those aquifers.
2. Subsidence may disrupt alluvial aquifer and affect well yields, water levels, and possibly quality in wells tapping those aquifers.
3. Approximately 100 acre-feet per year of ground water from "deep" aquifer(s) for dust suppression and reclamation would alter ground-water flow near the well(s) and could cause a lowering of water levels in wells tapping the same aquifer(s) in the vicinity of the tract.

Mining would adversely effect 28 predicted cultural sites , eight sites eligible for inclusion in the National Register, two sites pending, and a projected 9.90 kilometer long segment of the Chaco Road system. There is no inventory data for the paleontological resources in this PRLA.

One grazing allotment (#6010) would be adversely affected by the disturbance of 1,920 acres resulting in the loss of 191 AUMs.

A public road, San Juan County C-14 crosses 7,600 feet of this PRLA.

One Navajo gravesite would be adversely affected if mining occurred on this PRLA.

PRLA #NM-3837 (EASTERN ASSOCIATION PROPERTIES CORPORATION)
MIXED OWNERSHIP - UNDERGROUND AND SURFACE MINE

PRLA Number NM-3837 (Eastern Assoc. Properties Corp.) is approximately 5,120 acres and located about 36 miles south of Farmington, New Mexico. Of the total 5,120 acres of land surface, 4,800 acres are Federal, and 320 acres are Indian.

Mining of this PRLA would be in conjunction with four other PRLA's and one existing lease providing employment for a total of 250 people.

The following impacts may occur to ground water as a result of underground mining 2720 acres of this PRLA:

1. Subsidence may disrupt overlying bedrock aquifer(s) in the Ojo Alamo Sandstone and Nacimiento Formation for fracturing them. This would affect well yields, water levels and possibly water quality in wells tapping those aquifers.
2. Subsidence may disrupt alluvial aquifer and affect well yields, water levels, and possibly quality in wells tapping those aquifers.
3. Approximately 100 acre-feet per year of ground water from "deep" aquifer(s) for dust suppression and reclamation would alter ground-water flow near the well(s) and could cause a lowering of water levels in wells tapping the same aquifer(s) in the vicinity of the tract.
4. Two BLM wells exist within the tract. Both are completed in aquifers overlying the coal beds. The quantity or quality of water available to these wells may be affected by subsidence and/or mine dewatering. Some wells outside the tract could also be affected.

Mining would adversely effect 20 predicted cultural sites, 10 sites eligible for inclusion in the National Register, one site pending, and 3.20 kilometers of imaged segments of the Chaco Road system.

Mining would adversely effect a total of 45 fossil sites in this PRLA, six Class II (highly important), 17 Class III (important), and 22 Class IV (insignificant).

One grazing allotment (#6010) would be adversely affected by the disturbance of 1,780 acres resulting in the loss of 198 AUMs.

A public road, San Juan County C-14 crosses 14,900 feet of this PRLA.

Surface disturbance of 1,921 acres on this PRLA would increase erosion and soil characteristics and possible loss or destruction of suitable soils which may occur during overburden removal, stockpiling and reclamation.

Impacts to ground water would result from destruction of the stratified nature of the Fruitland Formation overburden and layers above the Pictured Cliffs Sandstone. These would be replaced with crumbled shale and sandstone rubble of a greater porosity. This could result in upward leakage from the underlying Pictured Cliffs Sandstone which contains water of a much greater salinity. There is also a possibility of a lowering of water levels in wells tapping the same aquifers in the vicinity of the PRLA.

PRLA #NM-3838 (EASTERN ASSOCIATION PROPERTIES CORPORATION)
MIXED OWNERSHIP (UNDERGROUND)

PRLA Number NM-3838 (Eastern Assoc. Properties Corp.) is approximately 4,787 acres and located about 37 miles southeast of Farmington, New Mexico. Of the total 4,787 acres of land surface, 4,321 are Federal and 466 are Indian.

Mining of this PRLA will be in conjunction with four other PRLA's. Employment data is not available.

Ground water impacts include the following:

1. Subsidence might disrupt overlying bedrock aquifers in the Ojo Alamo Sandstone by fracturing, and affect potential local ground water supplies from this aquifer.
2. Subsidence might disrupt alluvial aquifer and affect potential local supplies of shallow ground water.
3. Seepage of water from the underlying Pictured Cliffs Sandstone into the mine might affect the yield and water level of one well completed in this aquifer about one mile west of the tract.

Mining would adversely affect seven predicted cultural sites. In addition, a portion of the 336 fossil sites would be adversely affected by the surface activity related to the mine.

This PRLA overlaps 3,115 acres of the De-na-zin WSA and is almost entirely within the Bisti/De-na-zin ACEC. This would adversely affect the economic feasibility of mine operation within the constraints of this type of land use management.

One grazing allotment (#6010) would be adversely affected by the disturbance of 60 acres resulting in the loss of 191 AUMs.

PRLA #NM-3918 (ARCH MINERALS)
FEDERAL OWNERSHIP - SURFACE MINE

PRLA Number NM-3918 (Arch Minerals) is approximately 4,477 acres in size and is located about 40 miles south of Farmington, New Mexico. All of the 4,477 acres of surface land are of Federal ownership. Approximately 1,940 surface acres would be disturbed from mining.

This lease would be mined in conjunction with three other PRLA's as one mining unit. Based on acreage alone, it is estimated that the inclusion of this lease in the mining unit would require approximately 155 employees for a total of approximately 400 employees needed to mine the reserves of the entire unit. The mining activities would require approximately 150 acre/feet/year of water from deep wells for mining activities, dust suppression and reclamation.

Surface disturbance on this tract would increase erosion, soil contamination, changing soil characteristics and possible loss or destruction of suitable soils which may occur during overburden removal, stockpiling, and reclamation.

Ground water impacts involve destruction of stratified nature of Fruitland Formation overburden and all confining layers above the Pictured Cliffs Sandstone. These would be replaced with crumbled shale and sandstone rubble have a greater porosity than the original stratified material. This may result in upward leakage of water from the underlying Pictured Cliffs Sandstone which contains water of a greater salinity than the water in the Fruitland Formation at some locations.

Possible offsite reduction of well yields, lowering of water levels, and changes in water quality in wells tapping the Fruitland Formation and Pictured Cliffs Sandstone.

Withdrawal of 150 acre feet per year of ground water from "deep" aquifer(s) for reclamation and dust suppression would alter ground water flow near the well(s) and may cause a lowering of water levels in wells trapping the same aquifer in vicinity of the tract.

As for surface water impacts the following would occur:

1. Runoff from mined area would be impounded, resulting in an unknown but probably small amount of surface water lost to evaporation.
2. Increase in dissolved and suspended solids concentrations in runoff during reclamation phase until channels stabilize.
3. Use of saline or sodic ground water from "deep" aquifers may impact water quality of runoff from reclaimed area.
4. The following floodplains would be disrupted:

Bettonie Tsosie Wash - 315 acres
Bettonie Tsosie Tributary - 80 acres
Escavada Wash Tributary - 65 acres

There are no known fossil localities within this PRLA, therefore no impacts to paleontological resources are expected.

Fifteen known cultural resource sites (nine of which are recommended for National Register eligibility) and 30 predicted sites would be destroyed by mining. Also, 5.85 kilometer projected segments and 0.90 kilometer imaged segments of Chacoan roads would be destroyed.

Approximately 985 acres of this lease overlaps with the Ah-shi-sle-pah WSA. Mining activities are expected to have adverse effects on the WSA.

Grazing allotment #6013 would be affected by mining operations. Surface disturbance would result in a loss of 401 AUMs of livestock grazing per year over the life of the mine.

There are 11 Navajo residences located on this PRLA that would be adversely affected by mining. In addition there are four Navajo gravesites and one Navajo sacred site (offering point) located on the lease.

There is a powerline right-of-way which crosses this PRLA. It involves 21.07 acres and may require relocation due to mining operations. Also, three public roads (State Road 57 and county roads A-09 and A-10) which cross the lease and may be affected.

This PRLA overlaps with an area under Visual Resource Management Class II. Mining activities would impair the scenic quality of the area.

PRLA #NM-3919 (ARCH MINERALS)
FEDERAL OWNERSHIP - SURFACE MINE

PRLA Number NM-3919 (Arch Minerals) is approximately 4,478 acres and is located about 40 miles south of Farmington, New Mexico. All of the 4,478 acres of land surface are under Federal ownership. Approximately 1,900 acres of surface disturbance would result from mining activities.

Mining activities on this lease would require approximately 155 employees contributing to a total of 400 employees needed to mine unit 2 (Arch Minerals) of which this lease is a part.

Surface disturbance on this tract would increase erosion, soil contamination, changing soil characteristics and possible loss or destruction of suitable soils which may occur during overburden removal, stockpiling, and reclamation.

Ground water impacts involve destruction of stratified nature of Fruitland Formation overburden and all confining layers above the Pictured Cliffs Sandstone. These would be replaced with crumbled shale and sandstone rubble having a greater porosity than the original stratified material. This may result in upward leakage of water from the underlying Pictured Cliffs Sandstone which contains water of a greater salinity than the water in the Fruitland Formation at some locations.

Possible offsite reduction of well yields, lowering of water levels, and changes in water quality in wells tapping the Fruitland Formation and Pictured Cliffs Sandstone.

Withdrawal of 150 acre feet per year of ground water from "deep" aquifer(s) for reclamation and dust suppression would alter ground-water flow near the well(s) and may cause a lowering of water levels in wells trapping the same aquifer in vicinity of the tract.

As for surface water impacts the following would occur:

1. Runoff from mined area would be impounded, resulting in an unknown but probably small amount of surface water lost to evaporation.

2. Increase in dissolved and suspended solids concentrations in runoff during reclamation phase until channels stabilize.
3. Use of saline or sodic ground water from "deep" aquifers may impact water quality of runoff from reclaimed area.
4. Floodplains that would be disrupted include:
 - Kimbeto Wash - 110 acres
 - Ah-shi-sle-pah Wash - 60 acres
 - Ah-shi-sle-pah Tributary - 10 acres

Paleontological resources would be impacted by the disturbance of an estimated 336 fossil localities.

Two cultural resource sites of National Register eligibility and approximately 57 predicted sites would be impacted or destroyed from mining. Also, 6.30 kilometer projected segments of Chacoan roads would be destroyed.

This PRLA overlaps 3,156 acres of the Ah-shi-sle-pah WSA and is expected to have adverse effects on the wilderness characteristics of the WSA.

This PRLA overlaps with an area under Visual Resource Management Class II. Mining activities would impair the scenic quality of the area.

Grazing allotments #6010 and #6013 would be affected by mining activities. Approximately 315 AUMs of livestock grazing would be lost per year over the life of the mine.

There are two ferruginous hawk nests located on this PRLA. The nests, if not destroyed by mining operations, may be abandoned by the hawks if an adequate buffer zone is not provided.

There is 4.82 acres of State Road #56, 57 and 5.37 acres of powerline rights-of-way that may be affected by mining activities.

There are no known Navajo occupancies on this PRLA. One Navajo sacred site (offering point) has been reported to occur on this PRLA.

PRLA #NM-6801 (EASTERN ASSOCIATION PROPERTIES CORPORATION)
MIXED OWNERSHIP - UNDERGROUND MINE

PRLA Number NM-6801 (Eastern Assoc. Properties Corp.) is approximately 4,394 acres and located about 34 miles south of Farmington, New Mexico. Of the 4,394 total acres of land surface, 43 are Federal and 4,351 are Indian.

Mining of this PRLA will be in conjunction with four other PRLA's. Employment data is not available.

Ground water impacts include the following:

1. Subsidence might disrupt alluvial aquifer and affect potential local supplies of shallow ground water.
2. Seepage of water from the underlying Pictured Cliffs Sandstone into the mine might affect the yield and water level of one well completed in this aquifer about one mile west of the tract.

Mining would adversely affect 46 predicted cultural sites and a projected 2 kilometer segment of the Chaco road system. In addition, a portion of the 49 fossil sites in this PRLA would be adversely affected by the surface facilities and mining activities.

This PRLA overlaps 43 acres of the Bisti WSA. Mining of this portion of the PRLA would be affected by the limitations dictated by this type of land use management.

One Grazing Allotment (#6008) would be adversely affected by the disturbance of 125 acres resulting in the loss of 7 AUMs.

A natural gas pipeline (NM-042741) - 2,500 feet, a powerline (NM-0559354) - 9,600 feet, and a natural gas pipeline and telephone line (NM-066400) - 2,800 feet, cross this PRLA. In addition, State Road 371 crosses 5,200 feet of this PRLA.

There are six residences on this PRLA with related buildings and structures, located at T. 24 N., R. 13 W., Section 20: SW1/4 and NE1/4.

PRLA #NM-6802 (EASTERN ASSOCIATION PROPERTIES CORPORATION)
FEDERAL OWNERSHIP - SURFACE MINE

PRLA Number NM-6802 (Eastern Assoc. Properties Corp.) is approximately 340 acres located about 35 miles south of Farmington, New Mexico. The entire 340 total acres of land surface is owned by the Federal government.

Mining of this PRLA will be in conjunction with two other PRLA's and one existing lease providing employment for a total of 250 people.

Impacts to ground water would result from destruction of the stratified nature of the Fruitland Formation overburden and layers above the Pictured Cliff Sandstone. These would be replaced with crumbled shale and sandstone rubble of a greater porosity. This may result in upward leakage from the underlying Pictured Cliffs Sandstone which contains water of a much greater salinity. There is also a possibility of a lowering of water levels in wells tapping the same aquifers in the vicinity of the tract.

Mining would adversely effect these predicted cultural sites and an estimated six fossil sites in this PRLA.

This PRLA is entirely within the boundaries of the Bisti-De-na-zin ACEC. This could adversely effect the economic feasibility of mining within the constraints of this type of land use management.

One grazing allotment would be adversely affected by the disturbance of 340 acres resulting in the loss of 23 AUM's.

A powerline application (NM-34119) is pending which would permit crossing 2,600 feet of this PRLA.

PRLA #NM-6803 (EASTERN ASSOCIATION PROPERTIES CORPORATION)
MIXED OWNERSHIP - UNDERGROUND MINE

PRLA Number NM-6803 (Eastern Assoc. Properties Corp.) is approximately 5,121 acres located about 47 miles southeast of Farmington, New Mexico. Of the 5,121 acres of land surface, 4,961 are Federal and 160 are Indian.

Mining of this PRLA will be in conjunction with four other PRLA's. Employment data is not available.

The following impact may occur to ground water:

1. Subsidence may disrupt overlying bedrock aquifer(s) in the Ojo Alamo Sandstone and Nacimiento Formation for fracturing them. This would affect well yields, water levels and possibly water quality in wells tapping those aquifers.
2. Subsidence may disrupt alluvial and affect well yields, water levels, and possibly quality in wells tapping those aquifers.
3. Approximately 100 acre-feet per year of ground water from "deep" aquifers(s) for dust suppression and reclamation would alter ground-water flow near the well(s) and could cause a lowering of water levels in wells tapping the same aquifer(s) in the vicinity of tract.

Mining would adversely affect 46 predicted cultural sites, 22 sites eligible for and three sites pending inclusion in the National Register. In addition, 3.60 kilometer projected and 2.25 kilometer imaged segments of the Chaco road system cross this PRLA. Also, a portion of the 31 fossil sites would be adversely affected by related surface facilities and activities.

Public road C-14 crosses this PRLA for 8,400 feet.

There are four gravesites located within this PRLA. These sites would be adversely affected if mining occurs.

PRLA #NM-6804 (EASTERN ASSOCIATION PROPERTIES CORPORATION)
FEDERAL OWNERSHIP - UNDERGROUND

PRLA Number NM-6804 (Eastern Assoc. Properties Corp.) is approximately 1,602 acres located about 62 miles southeast of Farmington, New Mexico. This PRLA is entirely federally owned.

Mining of this PRLA will be in conjunction with three other PRLA's. No employment data is available.

The following impacts occur to ground water:

1. Subsidence may disrupt overlying bedrock aquifers(s) in the Ojo Alamo Sandstone and Nacimiento Formation for fracturing them. This would affect well yields, water levels and possibly water quality in wells tapping those aquifers.
2. Subsidence may disrupt alluvial aquifer and affect well yields, water levels, and possibly quality in wells tapping those aquifers.
3. Approximately 100 acre-feet per year of ground water from "deep" aquifers(s) for dust suppression and reclamation would alter ground-water flow near the well(s) and could cause a lowering of water levels in wells tapping the same aquifers(s) in the vicinity of tract.

Mining would adversely affect 45 predicted cultural sites and a projected 2.05 kilometer segment of the Chaco road system. A portion of the 19 fossil sites would also be adversely affected by surface facilities and activities.

This PRLA overlaps 1,214 acres of the Ah-shi-sle-pah WSA. This would adversely affect the economic feasibility of the mining unit.

A powering (NM-0556114) crosses 8,300 feet of this PRLA. Also New Mexico State Road 56/57 crosses 9,500 feet, San Juan County Road A-30 crosses 1,400 feet, San Juan County Road A-27 crosses 200 feet, and San Juan County A-28 crosses 4,000 feet of this PRLA.

PRLA #NM-7235 (EASTERN ASSOCIATION PROPERTIES CORPORATION)
FEDERAL OWNERSHIP - SURFACE MINE

PRLA Number NM-7235 (Eastern Assoc. Properties Corp.) is approximately 160 acres located about 42 miles southeast of Farmington, New Mexico. The entire PRLA is Indian withdrawal.

Mining of this PRLA will be in conjunction with three other PRLA's providing employment for a total of 250 people.

Surface disturbance on this PRLA would increase erosion and soil contamination, and result in the change of soil characteristics and possible loss or destruction of suitable soils which may occur during overburden removal, stockpiling and reclamation.

Impacts to ground water would result from destruction of the stratified nature of the Fruitland Formation overburden and layers above the Pictured Cliffs Sandstone. These would be replaced with crumbed shale and sandstone rubble of a greater porosity. This could result in upward leakage from the underlying Pictured Cliffs Sandstone which contains water of a much greater salinity. There is also a possibility of a lowering of water levels in wells tapping the same aquifers in the vicinity of the PRLA.

Mining would adversely affect two predicted cultural sites in this PRLA. In addition, at least ten fossil sites would be destroyed if mining occurred.

One Grazing Allotment (#6010) would be adversely affected by the disturbance of 160 acres resulting in the loss of 21 AUMs.

PRLA #NM-8128 (THERMAL - PEABODY)
MIXED OWNERSHIP - SURFACE MINE

PRLA Number NM-8128 (Thermal - Peabody) is approximately 4,499 and is located 38 miles west of Cuba, New Mexico. Of the total 4,499 acres for land surface 1,333 are Federal, 680 state, 1,040 Indian and 1,446 Indian withdrawal.

This PRLA will be mined in conjunction with three other PRLA's and need about 480 employees to mine the reserve.

Ground water impacts include the following:

1. Destruction of stratified nature of Fruitland Formation overburden and all confining layers above the Pictured Cliffs Sandstone. These would be replaced with crumbled shale and sandstone rubble having a greater porosity than the original stratified material. This may result in upward leakage from the underlying Pictured Cliffs Sandstone which contains water of a much greater salinity than the water in the Fruitland Formation at some locations.
2. Possible withdrawal of 100 acre feet per year of ground water from "deep" aquifer(s) for reclamation and dust suppression would alter ground water flow near the well(s) and may cause a lowering of water levels in wells tapping the same aquifer in the vicinity of the tract.
3. Approximately 340 acres of floodplain are within the PRLA which may be disrupted.

Mining would destroy the two known cultural resources sites and any other which may be within the PRLA. Forty-nine cultural sites are predicted to be within the lease. Thirty-one paleontological resources have been recorded that would be destroyed by mining.

Fourteen Navajo residences would be affected by this PRLA being developed. Two Navajo gravesites have been recorded on the Indian allotment portion of the PRLA. Two grazing allotments, #6017 and 6018 would be affected by the loss of 1,875 acres due to surface disturbance. This would displace about 228 AUMs.

Rights-of-way for a road (Serial #NM30254) crosses the PRLA for approximately 3,300 feet in length. A road maintained of San Juan County also crosses the PRLA for about 9,700 feet.

The PRLA overlaps both Class III and IV management areas for visual resources. The Continental Divide National Scenic Trail corridor traverses the lease area.

PRLA #NM-8129 (THERMAL - PEABODY)
FEDERAL OWNERSHIP - SURFACE MINE

PRLA Number NM-8129 (Thermal - Peabody) is approximately 1,520 acres and is located approximately 48 miles southeast of Farmington, New Mexico. All 1,520 acres of surface is federally owned.

As for surface water impacts the following would occur:

1. Runoff from mines area would be impounded, resulting in an unknown but probably small amount of surface water lost to evaporation.
2. Increase in dissolved and suspended solids concentrations in runoff during reclamation phase until channels stabilize.
3. Use of saline or sodic ground water from "deep" aquifers may impact water quality of runoff from reclaimed area.
4. 275 acres of Escavada Wash on its tributary floodplain would be disrupted.
5. Mining would destroy the five known cultural resources sites and any other which may be within the lease area along with the Chacoan road which passes through a portion of the PRLA. The 19 known paleontological sites would also be destroyed.

Grazing Allotment #6013 covers the PRLA. Mining of the lease would decrease the number of AUMs currently utilizing the native forage.

This PRLA is totally within a Class IV Visual Resource management area.

PRLA #NM-8130 (THERMAL - PEABODY)
MIXED OWNERSHIP - SURFACE MINE

PRLA Number NM-8130 (Thermal - Peabody) is approximately 2,133 acres and is located about 28 miles west of Cuba, New Mexico. Of the total 2,133 acres for land surface 973 are Federal, 280 Indian and 880 Indian withdrawal.

This PRLA will be mined in conjunction with three other PRLA's and ground water impacts include the following:

1. Destruction of stratified nature of Fruitland Formation overburden and all confining layers above the Pictured Cliffs Sandstone. These would be replaced with crumbled shale and sandstone rubble having a greater porosity than the original stratified material. This may result in upward leakage from the underlying Pictured Cliffs Sandstone which contains water of a much greater salinity than the water in the Fruitland Formation at some locations.
2. Possible withdrawal of 100 acre feet per year of ground water from "deep" aquifers(s) for reclamation and dust suppression would alter ground water flow near the well(s) and may cause a lowering of water levels in wells tapping the same aquifer in the vicinity of the tract.

Seven cultural resources sites and 1.6 kilometer of Chacoan road have been predicted while 10 paleontological sites have been recorded and more may exist. These sites would be destroyed by mining.

Twelve Navajo residences would be affected by this PRLA being developed. A Navajo sacred site used as an offering point is also within this PRLA.

A 2,900 foot long natural gas pipeline (Serial #NM09148) crosses the lease. The Bureau of Indian Affairs maintains a 4,900 foot road through the lease.

One Grazing Allotment #6018 encompasses the lease. It is predicted that approximately 1,580 acres of surface in the lease would be disturbed and 174 AUMs would be displaced.

This PRLA overlaps both Class III and IV management areas for visual resources. The Continental Divide Scenic Trail corridor traverses this lease.

PRLA #NM-8715 (THERMAL - PEABODY)
MIXED OWNERSHIP - SURFACE MINE

PRLA Number NM-8715 (Thermal - Peabody) is approximately 1,921 acres and located 32 miles west of Cuba, New Mexico. Of the total 1,921 acres of land surface, 640 are Federal, 960 are Indian, and 321 are Indian withdrawal.

Mining of this PRLA will be in conjunction with one other PRLA which will contribute to an existing mine lease thus providing employment for 250 additional people.

Surface disturbance on this tract would increase erosion, soil contamination, changing soil characteristics and possible loss or destruction of suitable soils which may occur during overburden removal, stockpiling and reclamation. The hydrological resource impacts include destruction of stratified nature of Fruitland Formation overburden and all confining layers above the Pictured Cliffs Sandstone. These would be replaced with crumbled shale and sandstone rubble having a greater porosity than the original stratified material. This may result in upward leakage of water from the underlying Pictured Cliffs Sandstone which may contain water of a much greater salinity than the water in the Fruitland Formation. Possible offsite reduction of well yields, lowering of water levels, and changes in water quality in wells. Withdrawal of ground water from deep aquifers for reclamation and dust suppression would alter ground water flow near the wells and may cause a lowering of water levels in wells tapping the same aquifers in vicinity of the tract.

Surface water impacts include the following:

1. Runoff from mined area would be impounded, resulting in an unknown but probably small amount of surface water lost to evaporation.
2. Increase in dissolved and suspended solids concentration in runoff during reclamation phase until channels stabilize. This area requires special attention during the mining and reclamation phases because a major tributary to Chaco Wash, Arroyo Puebló Alto, drains the area.
3. Use of saline or sodic ground water from "deep" aquifers may impact water quality of runoff from reclaimed areas.
4. Approximately 170 acre of floodplain may be disrupted within the PRLA.

Mining would adversely affect eight predicted cultural sites and a projected 1.6 kilometer segment of potential Chacoan road. In addition one highly important (Class II) fossil site, nine important (Class III) fossil sites, and five insignificant (Class IV) fossil sites would be destroyed by mining.

Two Grazing Allotments #6015 and #6019 would be affected by the disturbance of 560 acre within the PRLA resulting in the loss of 51 AUMs. One Indian occupancy would be affected by this PRLA.

A natural gas pipeline (NM-042741) crosses 2,500 feet of the PRLA; a powerline (NM-0559354) crosses 9,600 feet, and a natural gas pipeline and telephone line (NM-066400) crosses 2,800 feet of the PRLA.

The visual resources in this PRLA are in a Class III management area and mining would conflict with the management objectives for this classification. Also, mining activities on this PRLA could disrupt the Continental Divide National Scenic Trail location.

PRLA #NM-8717 (THERMAL - PEABODY)
MIXED OWNERSHIP - SURFACE MINE

PRLA Number NM-8717 (Thermal - Peabody) is approximately 600 acres and located 20 miles west of Cuba, New Mexico. Of the total 600 acres of land surface, 320 are public and 280 are Indian.

Mining of this PRLA will be in conjunction with one other PRLA which will contribute to an existing mine lease thus providing employment for 250 additional people.

Surface disturbance on this tract would increase erosion, soil contamination, changing soil characteristics and possible loss or destruction of suitable soils which may occur during overburden, removal, stockpiling, and reclamation.

The ground water impact include the following:

1. Destruction of stratified nature of Fruitland Formation overburden and all confining layers above the Pictured Cliffs Sandstone. These would be replaced with crumbled shale and sandstone rubble having a greater porosity than the original stratified material. This may result in upward leakage from the underlying Pictured Cliffs Sandstone which contains water of a much greater salinity than the water in the Fruitland Formation at some locations.
2. Possible offsite reduction of well yields, lowering of water levels, and changes in water quality in wells tapping the Quaternary Alluvium, Fruitland Formation, and Pictured Cliffs Sandstone.

Mining would adversely impact 14 predicted cultural sites. Inventory data is not available for paleontological resources on this PRLA.

One Grazing Allotment (#6023) would be affected by the loss of 480 acres within the PRLA resulting in the loss of 40 AUMs.

Mining activities on this PRLA could disrupt the Continental Divide National Scenic Trail location.

PRLA #NM-8745 (ARCH MINERALS)
MIXED OWNERSHIP - SURFACE MINE

PRLA Number NM-8745 (Arch Minerals) is approximately 520 acres in size and is located approximately 45 miles south of Farmington, New Mexico. Of the 520 acres of land surface, 320 acres are Federal and 200 acres are Indian. About 60 acres of the PRLA would receive surface disturbance.

Mining of this lease in conjunction with three others in Arch Minerals Unit 2 would require 10 employees making a total of 400 employees required to mine the unit.

Surface disturbance on this tract would increase erosion, soil contamination, changing soil characteristics and possible loss or destruction of suitable soils which may occur during overburden removal, stockpiling, and reclamation.

Ground water impacts involve destruction of stratified nature of Fruitland Formation overburden and all confining layers above the Pictured Cliffs Sandstone. These would be replaced with crumbled shale and sandstone rubble having a greater porosity than the original stratified material. This may result in upward leakage of water from the underlying Pictures Cliffs Sandstone which contains water of a greater salinity than the water in the Fruitland Formation at some locations.

Possible offsite reduction of well yields, lowering of water levels, and changes in water quality in wells tapping the Fruitland Formation and Pictured Cliffs Sandstone.

Withdrawal of five acre feet per year of ground water from "deep" aquifer(s) for reclamation and dust suppression would alter ground-water flow near the well(s) and may cause a lowering of water levels in wells trapping the same aquifer in vicinity of the tract.

As for surface water impacts the following would occur:

1. Runoff from mined area would be impounded, resulting in an unknown but probably small amount of surface water lost to evaporation.
2. Increase in dissolved and suspended solids concentrations in runoff during reclamation phase until channels stabilize.
3. Use of saline or sodic ground water from "deep" aquifers may impact water quality of runoff from reclaimed area.
4. Fifty-five acres of floodplain on Kimbeto Wash drainage may be disrupted.

Two cultural resource sites (one of National Register eligibility and one pending) and four predicted sites would be impacted or destroyed from mining. A one kilometer imaged segment of potential Chacoan road would also be destroyed.

Grazing Allotment #6013 would be affected. Approximately 43 AUMs of livestock grazing would be lost per year for the life of the mine.

PRLA #NM-9764 (THERMAL - PEABODY)
MIXED OWNERSHIP - SURFACE MINE

PRLA Number #NM-9764 (Thermal - Peabody) is approximately 240 acres and located about five miles south of Kimbeto, New Mexico. Of the total 240 acres of land surface, 40 are Federal, and 200 are Indian.

Mining of this PRLA will be in conjunction with four other PRLAs providing employment for a total of 400 people.

Surface disturbance this PRLA would increase erosion, soil contamination, changing soil characteristics and possible loss or destruction of suitable soils which may occur during overburden removal, stockpiling, and reclamation.

Ground water impacts involve destruction of stratified nature of Fruitland Formation overburden and all confining layers above the Pictured Cliffs Sandstone. These would be replaced with crumbled shale and sandstone rubble having a greater porosity than the original stratified material. This may result in upward leakage of water from the underlying Pictured Cliffs Sandstone which contains water of a greater salinity than the water in the Fruitland Formation at some locations.

Possible offsite reduction of well yields, lowering of water levels, and changes in water quality in wells tapping the Fruitland Formation and Pictured Cliffs Sandstone.

Withdrawal of 20 acre feet per year of ground water from "deep" aquifer(s) for reclamation and dust suppression would alter ground-water flow near the well(s) and may cause a lowering of water levels in wells trapping the same aquifer in vicinity of the tract.

As for surface water impacts the following would occur:

1. Runoff from mined area would be impounded, resulting in an unknown but probably small amount of surface water lost to evaporation.
2. Increase in dissolved and suspended solids concentration in runoff during reclamation phase until channels stabilize.
3. Use of saline or sodic ground water from "deep" aquifers may impact water quality of runoff from reclaimed area.
4. Approximately 15 acres of floodplain may be disrupted within the PRLA.

Mining would adversely affect one existing cultural site pending recommendation for inclusion in the National Register, three sites predicted on this PRLA, and 0.40 kilometer projected and 0.15 kilometer imaged segments of the Chacoan road system. Paleontological resource data is unavailable for this PRLA.

One Grazing Allotment #6013 would be affected by the loss of 190 acres within this PRLA resulting in the loss of 18 AUMs.

The visual resources in this PRLA are in Class III management area while a portion is in VRM Class IV area. Mining would conflict with the management objectives for these classifications. Also, mining activities on this PRLA could disrupt the Continental Divide National Scenic Trail location.

PRLA #NM-11670 (THERMAL - PEABODY)
MIXED OWNERSHIP - SURFACE MINE

PRLA Number NM-11670 (Thermal - Peabody) is approximately 1,119 acre and located nine miles east from the center of Chaco Canyon, New Mexico. Of the total 1,119 acres of land surface, 639 are Federal, and 480 are state owned.

Mining of this PRLA will be in conjunction with four other PRLA's providing employment for a total of 480 people.

Surface disturbance on this PRLA would increase erosion and soil contamination and result in the change of soil characteristics and possible loss or destruction of suitable soils which may occur during overburden removal, stockpiling and reclamation.

Ground water impacts include the following.

1. Destruction of stratified nature of Fruitland Formation overburden and all confining layers above the Pictured Cliffs Sandstone. These would be replaced with crumbled shale and sandstone rubble having a greater porosity than the original stratified material. This may result in upward leakage from the underlying Pictured Cliffs Sandstone which contains water of a much greater salinity than the water in the Fruitland Formation at some locations.
2. Possible withdrawal of 100 acre feet per year of ground water from "deep" aquifer(s) for reclamation and dust suppression would alter ground water flow near the well(s) and may cause a lowering of water levels in wells tapping the same aquifer in the vicinity of the tract.
3. Approximately 80 acres of floodplain may be disrupted within this PRLA.

There is no inventory data for cultural resources or paleontological resources.

One Grazing Allotment #6017 would be affected by the disturbance of 80 acres within this PRLA resulting in the loss of seven AUMs.

A natural gas pipeline, powerline and road (NM34781) crosses 4,000 feet of this PRLA.

The visual resources in this PRLA are in a Class III management area and mining would conflict with the management objectives for this classification.

PRLA #NM-11916 (KIN ARK)
MIXED OWNERSHIP - UNDERGROUND MINE

PRLA Number NM-11916 (Kin Ark) is approximately 2,880 acres and is located 30 miles south of Farmington, New Mexico. Of the total 2,880 acres for land surface 320 acres are Federal and 2,560 are Indian.

Approximately 450 employees would be needed to mine the reserves.

The following impacts may occur to ground water:

1. Subsidence may disrupt overlying bedrock aquifer(s) in the Ojo Alamo Sandstone and Nacimiento Formation for fracturing them. This would affect well yields, water levels and possibly water quality in wells tapping those aquifers.
2. Subsidence may disrupt alluvial aquifer and affect well yields, water levels, and possibly quality in wells tapping those aquifers.
3. Approximately 100 acre-feet per year of ground water from "deep" aquifer(s) for dust suppression and reclamation would alter ground-water flow near the well(s) and could cause a lowering of water levels in wells tapping the same aquifer(s) in the vicinity of tract.

Mining may impact a portion of the 13 predicted cultural resources sites and 15 known paleontological sites within the PRLA.

This PRLA overlaps 320 acres of the Bisti WSA and part of the Bisti/De-na-zin ACEC.

One ferruginous hawk nest is present. One-hundred and sixty-five acres have been withdrawn to protect this nest.

Grazing allotment #6008 may be affected by the mining activities. Nature vegetation would be destroyed by surface facilities.

Eight hundred acres of the PRLA are within as Class II management area for visual resources. The remainder, except for a small portion of the southeastern corner which is in a Class IV management area, is within a Class III management area.

APPENDIX A-2

COAL PROGRAM IMPLEMENTATION TO DATE

The following narrative summarizes the implementation of the federal coal program in the San Juan River Coal Region and presents the history and background leading to the publication of this EIS.

The BLM in New Mexico has developed a land use plan that identifies lands acceptable for competitive coal leasing. Coal-bearing lands of high, moderate, and low development potential were examined to determine their acceptability. Trade-offs with other possible uses were analyzed. The tracts analyzed in this EIS were found suitable for mining. (Documentation of this land use planning process is on file at the BLM's Resource Area Office in Farmington, New Mexico).

The surface owner consultation process was initiated during the BLM's land use planning. Surface owners in the San Juan River Region were consulted about their preference for coal mining on or adjacent to their lands. The response of the surface owners was not considered binding or contractual. Prior to lease sale, industry will be responsible for acquiring formal surface owner consent to mine tracts with private surface overlying federal coal.

On January 26, 1981, the Department of Energy (DOE) established its final goals for national and regional coal production, which included projected goals for the San Juan River Regional Coal Production. Two public hearings were held on the goals projected for the San Juan River Region in July 1981 during an 81-day public comment period. These goals were adopted by the Department of Interior (DOI) in November 1981.

A call for expression of leasing interest was issued by the BLM in September, 1981. Ten companies filed expressions of interest on approximately 2.3 billion tons. One company withdrew its expression of interest (900 million tons), reducing the total expression of interest to 1.14 billion tons. The 2.3 billion tons represents overlap of the expression of interest--the 1.14 figure has been adjusted so that no overlap occurs. (Information provided by industry is on file with the BLM Albuquerque District Office.)

At an April 1982 meeting the team considered the tract profiles along with the criteria developed at the March meeting and independently prepared federal and state tract ranking reports. The RCT ranked the tracts and selected the alternatives by tract to be considered in the EIS.

APPENDIX A-3

TRACT DELINEATION, SELECTION, AND RANKING

The expressions of industry interest (refer to Appendix A-2) and other geologic and mining information were used by the Minerals Management Service (MMS) to delineate 50 tracts for potential leasing. The tract delineation reports include identification of the coal resources, the annual production potential of each tract, the degree of certainty of the coal data, the expected type of mining, employment required to develop and operate the tract, acreage disturbed, and other information. This information was used to develop a site-specific analysis by the BLM to assess the environmental, social, and economic factors pertinent to or affected by development of each tract. (These analyses are available for review at the Farmington Resource Area Office of the BLM.)

Table A-3-1 presents the factors developed by the RCT for track ranking. Using these factors, each of the 50 tracts were first evaluated by a six-member team of BLM employees from the New Mexico State Office, the Albuquerque District Office, and the Farmington Resource Area Office. These tracts were also evaluated by an independent 14-member team of state employees. Both evaluations were based on geologic, mineral, and engineering information from the tract delineation reports and major impacts from the site-specific analyses for each tract. This information was provided to each member of the RCT, along with maps and other data for use in the tract ranking.

On April 20 and 21, 1982, the RCT met to review the state and federal staff ranking recommendations. Based on the factors listed in Table A-3-1, the RCT ranked the tracts and made a determination of which tracts should be grouped together, arriving at four different leasing levels. These leasing levels have been incorporated into this EIS as four alternatives.

The relative rank of the tracts is portrayed in the range of alternatives. The lower production alternatives contain the most desirable tracts, and the successively higher production alternatives add the less desirable tracts.

Of the original 50 tracts delineated, 39 were carried forward for further leasing and ranking. The summary ranking for each tract is shown in Table A-3-2. Six of the 50 tracts were combined to make three: Bisti #6 and #8 became Bisti #6, Crownpoint East (LC) and Crownpoint East (HC) became Crownpoint East, and Samson Lake #2 (LC) and Samson Lake #2 became Samson Lake #2. Two tracts were recommended as public body tracts (Nageezi and Twin Buttes), and seven tracts were delineated by MMS as small business tracts (Johnson Trading Post, Sundance, Tah-na-bah Well, Hogback, Pinehaven, Bread Springs #1 and Bread Springs #2).

A more detailed discussion of the ranking and selection processes is contained in the minutes of the RCT meetings held on April 20-21, which are available at the BLM New Mexico State Office in Santa Fe.

TABLE A-3-1
TRACT RANKING FACTORS

Coal Economics	Natural Environment	Socioeconomics
Coal Quantity	Air Quality	Public Attitudes
Coal Quality	Water Quality	Revenue Generation
Energy Production	Wildlife	Lifestyle and Social
Potential	Reclamation Potential	Structure
Transporation	Archaeology	Community and Social
Surface Ownership	Paleontology	Structure
	Historic Properties	Unsuitability Criteria
	Other Unique Resources	Consistency with Other
	Transportation	Plans & Policies
	Unsuitability Criteria	Agricultural Operations
		Relocation of Occupants

TABLE A-3-2

RANKING OF COAL TRACTS IN THE SAN JUAN RIVER REGION
NEW MEXICO

Tract	Summary Ranking	Rationale
La Plata #1	Medium	High quantity and quality of surface mineable coal, production potential moderate, federal surface, transportation would probably be by truck, some impacts to air quality, wildlife (deer winter range) and archaeology, minimal impact to water resources, no surface occupants, general public attitude is good, and socioeconomic impacts are expected to be minimal.
La Plata #2	Medium	High quantity and quality of underground mineable coal, production potential moderate, federal surface, transportation would probably be by truck, some impacts to archaeology, no surface occupants, general public attitude is good, and socioeconomic impacts are expected to be minimal.
La Plata #3	Medium	Low confidence in the quantity and quality of the coal resource for surface mineable coal, production potential is low, transportation would probably be by truck, the surface is primarily federal, some impacts to archaeology, air quality, wildlife (deer winter range), minimal impact to water resources, no surface occupants, general public attitude is good, and socioeconomic impacts are expected to be minimal.
La Plata #4	Medium	Low confidence in the quantity and quality of the coal resource for underground mineable coal, production potential is low, transportation would probably be by truck, surface is primarily private, some impacts to archaeology and a plant of high state interest, general public attitude is good, and socioeconomic impacts are expected to be minimal.
Johnson Trading Post	Medium	Moderate quantity and quality of surface mineable coal, production potential moderate, transportation to the proposed Star Lake railroad would be greater than five miles, surface ownership is primarily federal with some private ownership, major impacts to air quality and paleontology, some impacts to wildlife, archaeology, and historic resources, minimal impacts would occur to water, general public attitudes are favorable, a major impact on socioeconomics would likely occur, and families do occupy an area of this tract. Portions of this tract may need to be dropped in the areas of wildlife and occupant conflicts.

TABLE A-3-2 (cont'd)

Tract	Summary Ranking	Rationale
Star Lake East #1	Medium	High quantity and quality of surface mineable coal, production potential is moderate, transportation to the Proposed Star Lake railroad is greater than five miles, surface ownership is mixed but is primarily federal, major impacts to air quality and paleontology, some impacts to water resources, archaeology and historic resources, general public attitude is favorable, a major impact on socioeconomics is expected to occur, families do occupy this tract.
Star Lake East (LC)	Medium	Low confidence in the quantity and quality of the coal resource for underground mineable coal, production potential is moderate, transportation to the proposed Star Lake railroad is greater than five miles, surface ownership is primarily federal, some impacts are expected to occur to air quality, water resources and archaeology, general public attitude is favorable, impacts to socioeconomic resources are expected to occur, relocation of occupants will be minimal.
Star Lake West #2	Medium	High quantity and quality of surface mineable coal, production potential is moderate, transportation to the proposed Star Lake railroad is less than five miles, surface ownership is mixed federal and state, major impacts are expected to occur to air quality and paleontology, some impact to water resources, archaeology, historic and the Continental Divide Trail, general public attitude is favorable, and impacts to socioeconomics expected to be moderate.
Kimбето #1	Medium	High quantity and quality of underground mineable coal, production potential moderate, transportation to the proposed Star Lake railroad is less than five miles, surface ownership is mixed federal and private with surface ownership primarily federal, some impacts would occur to archaeology and water quality, general public attitude is favorable, impacts to socioeconomics are expected, and families do occupy portions of this tract.

TABLE A-3-2 (cont'd)

Tract	Summary Ranking	Rationale
Kimbeto #2	Medium	High quantity and quality of surface mineable coal, production potential is moderate, transportation to the proposed Star Lake railroad is less than five miles, surface ownership is federal, major impacts are expected to occur to air quality and paleontology, some impacts would occur to water resources, and archaeology, general public attitude is favorable, social economic impacts are expected to be minimal.
Nageezi	Medium	High quantity and quality of underground mineable coal, production potential is moderate, transportation to the proposed Star Lake railroad is greater than five miles, surface ownership is mixed but primarily federal, some impacts would occur to water resources and archaeology, general public attitude is favorable, some impacts to socioeconomics are expected, families do occupy areas of this tract.
Gallo Wash #1	Medium	High quantity and quality of surface mineable coal, production potential is favorable, transportation to the proposed Star Lake railroad is less than five miles, surface is primarily private with some federal ownership, major impacts are expected to occur to air quality and paleontology, some impacts would occur to water resources and archaeology, general public attitude is moderate, and socioeconomic impacts are expected to be moderate.
Gallo Wash #2	Medium	Moderate quantity and quality of underground mineable coal, production potential is moderate, transportation to the proposed Star Lake railroad is greater than five miles, surface ownership is mixed with primary ownership being state, some impacts would occur to water resources and archaeology, general public attitude is favorable, socioeconomic impacts are expected to be minimal, occupants do occur on areas of this tract.

TABLE A-3-2 (cont'd)

Tract	Summary Ranking	Rationale
Bisti #1	Medium	High quantity and quality of surface mineable coal, production potential is moderate, transportation to the proposed Star Lake railroad is less than five miles, surface ownership is mixed, but is primarily federal, major impacts to air quality and paleontology would occur, some impacts to water resources, archaeology and recreation resources in the Bisti Badlands, general public attitude and economics are favorable, known Navajo sacred and historic areas, no occupants.
Bisti #2	Medium	High quantity and quality of surface mineable coal, production potential is moderate, transportation to the potential Star Lake railroad is less than five miles, surface ownership is mixed and is primarily private, major impacts to paleontology, some impacts to air quality, water resources, archaeology, and recreation are expected to occur, general public attitude and economics are favorable, social impacts are moderate. Occupants do occur on areas of this tract.
Bisti #4	Medium	High quantity and quality of surface mineable coal, production potential moderate, transportation to the proposed Star Lake railroad is less than five miles, surface ownership is mixed with private land and federal land being nearly equal, major impacts to paleontology and wildlife area for the ferruginous hawk (acreage for these high federal interest species would need to be dropped out); impacts would occur to air quality, water resources and archaeology, general public attitude is favorable, socioeconomic impacts are expected to be minimal, known Navajo gathering areas occur on the tracts, no occupants.

TABLE A-3-2 (cont'd)

Tract	Summary Ranking	Rationale
Bisti #6	Medium	High quantity and quality of surface mineable coal, production potential moderate, transportation to the proposed Star Lake railroad is less than five miles, surface ownership mixed with primarily private lands under Navajo ownership, major impacts to paleontology and unique scenic resources of the Bisti Badlands, some impacts to air quality and archaeology, general public attitude is unfavorable, social impacts to the Navajo is considerable, known burial sites occur on tract, economic impacts are minimal, occupants do occur on areas of this tract.
Lee Ranch East	High	High quantity and quality of surface mineable coal, production potential high, transportation to the proposed Star Lake railroad is greater than fifteen miles, private surface, some impacts to air quality, water resources and archaeology, general public attitude is good, socioeconomic impacts are expected to be minimal, no occupants.
Lee Ranch Middle	Medium	High quantity and quality of surface mineable coal, production potential moderate, transportation to the proposed Star Lake railroad is less than fifteen miles, private surface, major impacts to air quality and water resources, some impacts to wildlife and archaeology are expected, general public attitude is good, some impacts on socioeconomics are expected, no occupants.
Lee Ranch West	High	High quantity and quality of surface mineable coal, production potential high, transportation to the proposed Star Lake railroad is less than fifteen miles, private ownership, major impacts to air quality, some impacts to water resources and archaeology, general public attitude is good, some impacts on socioeconomics are expected, no occupants.

TABLE A-3-2 (cont'd)

Tract	Summary Ranking	Rationale
Divide	High	High quantity and quality of surface mineable coal, production potential high, proposed Star Lake railroad traverses the tract, surface ownership is primarily private, consent has been given, some impacts to air and water resources, general public attitude is good, some impacts for socioeconomics are expected, occupants occur in the southwest portion of the tract.
Crownpoint Northeast	Medium	Moderate confidence in the quantity and quality of surface mineable coal, production potential is low, transportation to the proposed Star Lake railroad is greater than fifteen miles, primarily Navajo owned surface, major impacts to air quality, some impacts to archaeology and State listed high interest plant species, general public attitude is unfavorable, major impacts on socioeconomics, and thirty seven (37) occupied homes occur on the tract.
Crownpoint East	Medium	Moderate confidence in the quantity and quality of surface mineable coal, production potential is moderate, transportation to the proposed Star Lake railroad is less than fifteen miles, primarily Navajo surface, some impacts to air, water, and archaeology resources, general public attitude is favorable, major impacts on socioeconomics and twenty five (25) occupied homes occur on the tract.
Hospah #1	High	High quantity and quality of surface mineable coal, production potential is high, proposed Star Lake railroad passes through tract, no federal surface, major impacts to air quality, some impacts to water resources, wildlife, archaeology, and the CDNST, general public attitude is good, little impact to socioeconomics is expected, no occupants.
Hospah #2	High	High quantity and quality of underground mineable coal production potential is high, proposed Star Lake railroad passes within one mile of tract, no federal surface, some impacts to CDNST, general public attitude is good, socioeconomic impacts are expected to be minimal, no occupants.

TABLE A-3-2 (cont'd)

Tract	Summary Ranking	Rationale
Chico Wash South	Medium	Moderate confidence in the quantity and quality of surface mineable coal, production potential is low, transportation to the proposed Star Lake railroad is greater than fifteen miles, primarily federal surface, major impacts to air quality, water resources, and wilderness, some impacts to archaeology and historic resources (Azabache Stage Station located in tract boundaries), public has expressed concern due to close proximity to WSA, socioeconomic impacts are expected to be significant, no occupants.
Catalpa Canyon	Medium	High quantity and quality of surface mineable coal, production potential is moderate, transportation to the AT and SF railroad is less than five miles, all private surface, some impacts to air quality, and state high interest plant species, general public attitude is favorable, socioeconomic impacts are expected to be minimal, no occupants.
Sundance	Medium	High quantity and quality of surface mineable coal production potential is moderate, transportation is less than five miles to AT and SF railroad, Navajo surface, major impacts to archaeology, some impacts to air quality, general public attitude is favorable, major impacts to social well being and minimal impact to economics, seven (7) occupied homes on the tract.
Tah-ha-bah Well	Low	Low confidence in the coal, natural environment and socioeconomic data available for this tract, however, small business has expressed interest in this tract, twenty one (21) occupied homes.
Hogback	Low	Low confidence in the coal, natural environment and socioeconomic data thats available for this tract, however small business has expressed interest in this tract, state listed high interest species, adjacent to high school, seventeen (17) occupied homes and a fully occupied trailer court occurs on this tract.

TABLE A-3-2 (cont'd)

Tract	Summary Ranking	Rationale
Twin Buttes	Low	Low confidence in the coal, natural environment, and socioeconomic data available for this tract, however small business has expressed interest in this tract, ninety three (93) occupied homes occur on this tract.
Pinehaven	Medium	Low confidence in the coal, natural environment and socioeconomic data available for this tract, small business has expressed interest and would acquire more coal data and work with surface ownership to acquire consent, no federal ownership, transportation to the AT and SF railroad is less than fifteen miles, some impacts to archaeology, water and air quality, one hundred and seven (107) occupied homes occur on the tract, general public attitude is unfavorable.
Bread Springs #1	Medium	Low confidence in the coal, natural environment, and socioeconomic data that's available for this tract, small business has expressed interest in obtaining additional coal data and will try to get surface owner consent, no federal surface, some impacts to air quality, general public attitude is unfavorable, socioeconomic impacts would be significant, seventeen (17) occupied homes occur on the tract.
Bread Springs #2	Low	Low confidence in the coal, natural environment, and socioeconomic data that is available for this tract, small business has expressed interest in obtaining this tract and in gathering additional coal data, no federal surface, general public attitude is unfavorable, socioeconomic impacts are expected to be minimal, no surface occupants.
Gamerco #1 (HC)	Medium	High quantity and quality of surface mineable coal, production potential moderate, transportation to the AT and SF railroad is less than five miles, no federal surface, some impacts to air quality, general public attitude is favorable, socioeconomic impacts are expected to be moderate, two (2) occupied homes occur on the tract.

TABLE A-3-2 (Concluded)

Tract	Summary Ranking	Rationale
Gamerco #1 (LC)	Medium	Low confidence in the quantity and quality of the surface mineable coal, moderate production potential due to the close proximity of Carbon Coal's existing mine and transportation is in place, no federal surface, some impacts to air quality, general public attitude is unfavorable, socioeconomic impacts are expected to be moderate, two (2) occupied homes occur on the tract.
Gamerco (UG) (LC)	Medium	Low confidence in the quantity and quality of the underground mineable coal, moderate production potential due to the close proximity to Carbon Coal's existing mine and transportation is in place, no federal surface, general public attitude is unfavorable, socioeconomic impacts are expected to be significant, thirty five (35) occupied homes occur on this tract.
Samson Lake #1	Medium	Low confidence in the quantity and quality of the underground mineable coal, moderate production potential due to the close proximity to Carbon Coal's existing mine and transportation is in place, primarily private surface, some impacts to water resources, general public attitude is favorable, socioeconomic impacts are expected to be moderate, thirty three (33) occupied homes occur on this tract.
Samson Lake #2	Medium	Moderate confidence in the quantity and quality of the surface mineable coal, production potential is moderate, due to the close proximity of Carbon Coal's existing mine and transportation is in place, some impacts to air quality, general public attitude is favorable, socioeconomic impacts are expected to be minimal, fifteen (15) occupied homes occur on this tract.

APPENDIX A-4

FEDERAL LAWS AND REGULATIONS AFFECTING COAL DEVELOPMENT

Resource	Popular Name	Law/Regulation/ U.S. Code Citation	Purpose/Major Relevance
Air Quality	National Environmental Policy Act of 1969	91-190; 42 U.S.C. 4321	Makes environmental protection part of the mandate of every federal agency. Requires impact statement for major federal actions with potentially significant impacts.
	Clean Air Act Amendments of 1977	95-95; 42 U.S.C. 7401	Provides legislative authority to control energy development on environmental grounds. Impact statement process must be integral part of coal leasing system.
Topography, Geology and Soils			Establishes requirements for areas failing to attain National Ambient Air Quality Standards (NAAQS). Provides for prevention of significant deterioration of areas where air is cleaner than NAAQS. May require a federal permit where conflicts with coal development exist. Modifies 1970 air act provisions regarding federal facilities, enforcement strategies, coal utilization impacts, and inter-state air pollution.
			May make certain coal lands off-limits for development. Limits industrial developments within and adjacent to areas exceeding NAAQS and areas pre-serving clean air quality. Reduces commercial attractiveness of low-sulfur Western coal as the new source standard changed to percent emissions reduction.
		30 CFR 817.95 (OSM)	Requires underground operator to employ fugitive dust control measures.
		30 CFR 784.26 (OSM)	Requires operator to establish monitoring systems for evaluation of dust control programs.
		43 CFR 3465 (BLM)	Operators will use mining methods to prevent or control surface subsidence to maintain value and use of surface lands. Disturbed areas will be con-toured and regulated after exploration.
		30 CFR, Part 816	Permanent Program Performance Standards — Surface Mining Activities.
		30 CFR, Sections 816.21 through 816.25	Topsoil removal, storage, redistribution, and soil amendments.

APPENDIX A-4

FEDERAL LAWS AND REGULATIONS AFFECTING COAL DEVELOPMENT (CONTINUED)

Resource	Popular Name	Regulation/Law/ U.S. Code Citation	Purpose/Major Relevance
Topography, Geology and Soils (Continued)		30 CFR, Section 816.41 through 816.57	Hydrologic balance, sediment control, impoundments, acid spoils and stream buffer zones.
		30 CFR, Sections 816.71 through 816.74	Disposal of excess spoil material.
		30 CFR, Sections 816.101 through 816.106	Backfilling, grading, and rill stabilization.
		30 CFR, Sections 816.111 through 816.117	Revegetation.
	Department of Interior Policy		The Minerals Management Service will determine priority of development between coal, oil, and gas. Future uranium mineral claimants will coordinate with coal lessee. Unresolved conflicts will be settled in court.
Mineral Resources	Mining and Minerals Policy Act of 1970	91-631; 43 U.S.C. 21	Declares Congressional Mineral Policy.
	Noise Control Act of 1972	92-574; 42 U.S.C. 4901	Provides broad, general principles for mineral resource development. Requires publication of information on limits of noise required to protect public health and welfare. Preempts local control of railroad equipment and yard noise emissions.
	Resources Conservation and Recovery Act of 1976	94-580; 42 U.S.C. 6901	Regulations may be proposed to control coal mining areas and activities. Establishes guidelines for collection, transport, separation, recovery, and disposal of solid waste. Creates major federal hazardous waste regulatory program. Provides assistance to establish state or regional solid waste plans.
			Mining locations may be affected by EPA regulations governing disposal of coal mining wastes. Coal industry faced with stringent permit requirements if coal wastes classified by EPA as hazardous.

APPENDIX A-4

FEDERAL LAWS AND REGULATIONS AFFECTING COAL DEVELOPMENT (CONTINUED)

Resource	Popular Name	Regulation/Law/ U.S. Code Citation	Purpose/Ma. for Relevance
Paleontology		16 U.S.C. 431-433	Collection of vertebrate fossils prohibited.
	Federal Land Policy and Management Act Section 102 (a) (8)	43 U.S.C. 1701 (a) (8)	It is BLM policy to determine mitigation or protection stipulations for paleontology on a case-by-case basis. Clearances will be required for all surface-disturbing activities on coal tracts to avoid unnecessary destruction or disruption of fossils and collecting sites. Important sites will be salvaged.
	Antiquities Act of 1906	59-209; 16 U.S.C. 431	Regulates antiquities excavation and collection (including fossil remains). Protects historical values on public land.
	Archaeological and Historical Preservation Act of 1974; Archaeological Salvage Act	93-291, 86-523; 16 U.S.C. 469	Mitigates potential harm to historical, archaeological, and paleontological resources. Provides for recovery of data from areas to be affected by federal actions. Provides for preservation of data (including relics and specimens) at every federal construction project.
Water Resources			Mitigates potential harm to historical, archaeological, and paleontological resources. Mitigates potential harm to historical and archaeological resources.
	Clean Water Act of 1977	95-217; 33 U.S.C. 1251	Establishes effluent limitations for new and existing industrial discharges into U.S. waters. Limitations set for public treatment discharges; with pretreatment by industrial users. Provides mechanism to restore and maintain integrity of the nation's waters.
			May reduce development options in areas where anti-degradation policy restricts discharges into high quality waters. Treatment facilities in areas with rapidly expanding infrastructures must meet water quality standards. Effluent standards apply to coal mining point sources.

APPENDIX A-4

FEDERAL LAWS AND REGULATIONS AFFECTING COAL DEVELOPMENT (CONTINUED)

Resource	Popular Name	Regulation/Law/ U.S. Code Citation	Purpose/Major Relevance
Water Resources (Continued)	Safe Drinking Water Act of 1977	95-190; 42 U.S.C. 300	Establishes mechanism for National Primary Drinking Water Standards.
		30 CFR 817.42 (OSM)	EPA conducting study of the impacts of pits, ponds, lagoons, etc. on underground water supplies for public water systems.
		30 CFR 817.45 150-176 (OSM)	Restricts pollutant discharge.
		30 CFR 817.54 (OSM)	Amount of sediment produced will be minimized by conformance.
		30 CFR 817.121 (OSM)	Disrupted water supplies will be replaced.
Vegetation	Surface Mining Control and Reclamation Act of 1977	33 U.S.C. 1251 et. seq.	Mining will be conducted to minimize surface damage.
		U.S.C. 1265 (b) (19)	Establishes water quality standards adopted by N.M. Water Quality Control Commission and approved by Environmental Protection Agency.
		95-192; 16 U.S.C. 2001	Diverse and permanent vegetative cover capable of self-regeneration at least equal in extent to natural vegetation will be established on affected areas.
		30 CFR 817.13 (OSM)	Requires appraisal by Secretary of Agriculture of information and expertise on conservation and use of soils, plants, woodlands, etc.
		30 CFR 817.54 (OSM)	Provides opportunity for expanded data base.
	Soil and Water Resources Conservation Act of 1977	30 CFR 817.13 (OSM)	Exposed underground openings will be managed to ensure safety of people and livestock.
		30 CFR 817.54 (OSM)	Disrupted water supplies will be replaced.

APPENDIX A-4

FEDERAL LAWS AND REGULATIONS AFFECTING COAL DEVELOPMENT (CONTINUED)

Resource	Popular Name	Regulation/Law/ U.S. Code Citation	Purpose/Major Relevance
Wildlife	Bald Eagle Protection Act of 1969, as amended	86-70; 16 U.S.C. 668	Protects bald and golden eagles. May make certain coal lands off-limits for development.
	Endangered Species Act of 1973; as amended	93-205; 16 U.S.C. 1531	Protects endangered and threatened species and critical habitat from federal activities. Requires prior consultation with Fish and Wildlife Service. May make certain coal lands unsuitable for development.
	Fish and Wildlife Coordination Act of 1934.	85-624; 16 U.S.C. 661	Required consultation about water resource development actions which might affect fish or associated wildlife resource. Mitigates potential federal coal development impacts.
		30 CFR 817 (OSM)	Requires restoration of soils and vegetation allows wildlife to repopulate area upon completion of mining and removal of surface facilities.
Cultural Resources	Migratory Bird Treaty Act of 1981	16 U.S.C. 703-711; 40 Stat. 755	Regulates the taking, selling, etc., of birds, the nests, eggs or parts. Disturbance of nests or parts. Disturbance of nests can be prosecuted under this law.
	Historic Preservation Act of 1966	89-665; 16 U.S.C. 470 See also 94-429; 16 U.S.C. 1609	Establishes system of classifying properties on or eligible for inclusion on Historic Register. Mandates federal agency consultation with Advisory Council and State historic preservation officers.
	Antiquities Act of 1906		Mitigate potential harm to historical and archaeological values.
	Archaeological and Historical Preservation Act of 1974;		Refer to Paleontology
			Refer to Paleontology
		16 U.S.C. 469	A lessee will be required to carry out intensive field inventories of cultural resources on uninventoried portions of the areas that may be affected by lease-related activities, and develop mitigation plans that include, as appropriate, pro-

APPENDIX A-4

FEDERAL LAWS AND REGULATIONS AFFECTING COAL DEVELOPMENT (CONCLUDED)

Resource	Popular Name	Regulation/Law/ U.S. Code Citation	Purpose/Major Relevance
Cultural Resources (Continued)	Archaeological Resources Protection Act of 1979	96-95	visions for data recovery, curation, detailed recordation, stabilization, and relocation to provide appropriate levels of protection from adverse effects for specific properties.
	Title V, Chaco Culture National Historical Park	96-550	Protects archaeological resources on public land and Indian land.
			Enlarges Chaco Canyon Nation Monument and changes its name to Chaco Culture National Historical Park. Establishes 33 Chaco Culture Archeological Protection Sites and provides legal guidance for protection.
Visual Resource Management		30 CFR 717.14 (a) (OSM)	Disturbed work areas will be regraded to approximate original contour upon completion of Mining.
		30 CFR 817.111-117 (OSM)	Revegetation requirements.
Wilderness	Federal Land Policy and Management Act	43 U.S.C. 1782	Access across public lands under review for wilderness is granted by the Secretary only when it would not impair suitability of the area for that designation.
Land Uses		43 U.S.C. 1712	Valid existing rights will be identified and protected in BLM Land-Use Plans.
Transportation		30 CFR 817.124 (OSM)	Rights-of-Way will be protected.
Social and Economic Factors	Mineral Leasing Act of 1920, as amended	30 U.S.C. 191	Fifty percent of royalties from Federal coal will be returned to the State.
American Indian Concerns	American Indian Religious Freedom Act	Public Law No. 95-341	Requires consideration of Indian religious practices.
	"Guidelines for Human Burials"		Provides guidelines in handling and relocating human burials.

APPENDIX A-5

STATE LEGISLATION AND REGULATIONS AFFECTING COAL DEVELOPMENT

Legislation	Purpose/Relevance
New Mexico Air Quality Control Regulation 201	Specifies standards not to be equalled or exceeded.
New Mexico Air Quality Standards and Regulation, Section 672	Coal handling equipment will be equipped to prevent particulate matter from becoming airborne. Haul roads will be sprayed to prevent particulate matter from becoming airborne.
State of New Mexico Senate Memorial 31	Mining operators on state lands will notify the State of New Mexico, Dept. of Finance and Administration, Office of Cultural Affairs, if important fossils are found.
N.M. Stat. Annot. (1953 Compil.), Section 72-2-1	The State Engineer has general supervision of waters of the state and of the measurement, appropriation and distribution thereof. Other statutes administered by the State Engineer that affect coal development are: Section 69-3-6 N.M.S.A. 1978 Comp. Any person drilling a mine lode discovery hole or mine drill hole to a depth of 10 feet more, and encounters a water body or water-bearing stratum shall plug and report to the State Engineer. Section 72-12-A N.M.S.A. 1978 Comp. Any person desiring to engage in mine dewatering in a declared underground water basin shall apply to the State Engineer for a permit.
New Mexico Surface Mining Act of 1979; New Mexico Coal Surface Mining Commission, Rule 80-1, part 20;	Full range of coal mining protection including, diverse and permanent vegetative cover capable of self-regeneration at least equal in extent to natural vegetation will be established on affected areas.
Rule 80-1, part 20-41 <u>et seq.</u>	Surface coal mining operations will be planned and conducted to minimize adverse changes in water quality and quantity.
N.M. Regulation 563, as amended	The New Mexico State Department of Game and Fish is responsible for state endangered species and subspecies.
New Mexico Severance Tax Act	Tax of \$.38/ton will be paid on steam coal.

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APPENDIX A-6
SUMMARY OF SITE SPECIFIC IMPACTS TO
RESOURCE VALUES AND LAND USES BY PRLA NUMBER

Lease No. and Company	Legal Description	Total Acreage	Surface Ownership (Acres)					Type of Mine	Percent of Lease Inventoried	Predicted No. of Sites On Lease	Cultural Resources		Potential Chacoan Roads on PRLAs (kms)		Paleontology				ACEC Occurrence	Indian OccupanciesB/ (number of sites)	Wilderness Study Areas		Grazing Allotments (portions only - by Allotment No.)	AUMs
			Public	State	Indian	Withdrawal	Private				National Register Recommendations Eligible	Pending	Projected Segments	Imaged Segments	No. of Sites (Class)						Acreage	Percent of PRLA		
															I	II	III	IV						
Arch Minerals NM-3752	T. 23 N., R. 12 W., Sec. 17, Lot 5, W1/2SW1/4; Sec. 18, Lots 2, 3, 4, 6, SE1/4NE1/4, SE1/4NW1/4, E1/2SW1/4, SE1/4; Sec. 19, All; Sec. 20, Lots 4, 5, 6, 9-16; Sec. 21, Lots 1, 2, 3, 6, 7, 8, 9-16; Sec. 22, All; Sec. 23, Lots 1-8, S1/2; Sec. 25, SE1/4.	3,760	3,085	0	515	160	0	Surface	73	37	21	2	2.30	0	0	14	60	107		1 (Abandoned)			6009, 6010, 6012	341
NM-3753	T. 23 N., R. 12 W., Sec. 9, E1/2; Sec. 10, Lots 1-8, E1/2; Sec. 13, All; Sec. 14, Lots 1-8, N1/2; Sec. 15, Lots 1-8, N1/2.	2,951	1,159	672	800	0	320	"	16	90	0	0	0	0	1	8	60	130		0			6010, 6012	240
NM-3754	T. 23 N., R. 12 W., Sec. 26, NW1/4, N1/2SW1/4, NW1/4SE1/4; Sec. 27, All; Sec. 28, All; Sec. 29, All; Sec. 30, Lots 1, 2, 3, 4, E1/2, E1/2W1/2; Sec. 33, NE1/4NW1/4, W1/2W1/2; Sec. 35, SE1/4SE1/4.	3,075	1,555	0	0	1,520	0	"	31	40	2	0	0	0	0	2	15	25		0			6012	224
NM-3755	T. 22 N., R. 11 W., Sec. 4, SW1/4; Sec. 6, All; Sec. 8, All; Sec. 10, NE1/4, NW1/4, SE1/4; Sec. 12, All.	2,588	1,468	0	1,120	0	0	"	25	n/a	10	5	1.50	0.10	h/ h/	h/ h/	1	1		0			6010, 6013, 6016	268
NM-3918	T. 22 N., R. 10 W., Sec. 17, All; Sec. 18, Lots 1-4, E1/2, E1/2W1/2; Sec. 19, Lots 1-4, E1/2, E1/2W1/2; Sec. 22, All; Sec. 23, All; Sec. 24, All; Sec. 25, All.	4,477	4,477	0	0	0	0	"	43	30	9	6	5.85	0.90	0	0	0	0		6 (1 Abandoned, 1 Currently Unused)	985	22	6013	401
NM-3919	T. 22 N., R. 10 W., Sec. 5, Lots 1-4, S1/2N1/2, S1/2; Sec. 6, Lots 1-7, S1/2NE1/4; SE1/4NW1/4, E1/2SW1/4, SE1/4; Sec. 7, Lots 1-4, E1/2, E1/2W1/2; Sec. 8, All; Sec. 9, All; Sec. 14, All; Sec. 15, All.	4,478	4,478	0	0	0*	0	"	29	57	2	0	6.30	0	2	22	136	176		0	3,156	70	6010, 6013	315
NM-8745	T. 22 N., R. 10 W., Sec. 20, SE1/4NW1/4; Sec. 21, E1/2, NW1/4.	520	320	0	200	0	0	"	92	4	1	1	0	1.00	0	0	0	0		0			6013	43
Eastern NM-3834	T. 24 N., R. 12 W., Sec. 20, All; Sec. 21, All; Sec. 22, All; Sec. 23, All; Sec. 24, All; Sec. 25, All; Sec. 26, All.	4,804	4,591	0	213	0	0	e/	0	n/a	0	0	0	0	0	0	21	19	X	0	4,591	95	6008, 6010	302
NM-3835	T. 23 N., R. 12 W., Sec. 1, All; Sec. 2, SE1/4; Sec. 3, Lots 5-16, SW1/4; Sec. 4, All; Sec. 5, Lots 5-12; Sec. 11, All; Sec. 12, All; Sec. 24, Lots 1-8, S1/2.	4,500	1,325	2,215	960	0	0		14	28	2	0	1.75	0	0	6	20	46	X	0			6010	455
NM-3836	T. 23 N., R. 11 W., Sec. 15, All; Sec. 17, All; Sec. 18, Lots 1-4, E1/2, E1/2W1/2; Sec. 19, Lots 1-4, E1/2, E1/2W1/2; Sec. 20, All; Sec. 21, All; Sec. 22, All; Sec. 23, All.	5,110	3,830	1,280	0	0	0		47	28	8	2	9.90	0	0	0	0	0		0			6010	483
NM-3837	T. 23 N., R. 11 W., Sec. 24, All; Sec. 25, All; Sec. 26, All; Sec. 27, All; Sec. 28, All; Sec. 33, All; Sec. 34, All; Sec. 35, All.	5,120	4,800	0	320	0	0		41	20	10	1	0	3.20	0	0	0	0		0			6010	593
NM-3838	T. 24 N., R. 12 W., Sec. 27, All; Sec. 28, All; Sec. 29, All; Sec. 31, All; Sec. 33, All; Sec. 34, All; Sec. 35, All.	4,787	4,321	0	466	0	0		0	7	0	0	0	0	0	6	17	22	X	0	3,115	65	6008, 6010	320
NM-6801	T. 24 N., R. 12 W., Sec. 19, All; T. 24 N., R. 13 W., Sec. 19, Lots 1-4, E1/2, E1/2W1/2, Sec. 20, All; Sec. 21, All; Sec. 22, All; Sec. 23, All; Sec. 24, All.	4,394	43	0	4,351	0	0		0	46	0	0	2.00	0	0	3	34	35	X	1 (Currently Unused)	43	1	6008 (Navajo Indian Irrigation Project)	358
NM-6802	T. 23 N., R. 12 W., Sec. 6, Lots 8-15.	340	340	0	0	0	0		0	3	0	0	0	0	0	0	3	8	X	0			6009	23

Lease No. and Company	Legal Description	Total Acreage	Surface Ownership (Acres)					Type of Mine	Percent of Lease Inventoried	Predicted No. of Sites On Lease	Cultural Resources		Potential Chacoan Roads on PRLAs (kms)		Paleontology				ACEC Occurrence	Indian Occupancies ^{a/} (number of sites)	Wilderness Study Areas		Grazing Allotments (portions only - by Allotment No.)	AUMs	
			Public	State	Indian	Withdrawal	Private				National Register Recommendations Eligible Pending	Projected Segments	Imaged Segments	No. of Sites (Class)				Acreage			Percent of PRLA				
														I	II	III	IV								
Eastern (Cont'd)																									
NM-6803	T. 23 N., R. 10 W., Sec. 18, Lots 1-4, E ¹ / ₂ , E ¹ / ₂ W ¹ / ₂ ; Sec. 19, Lots 1-4, E ¹ / ₂ , E ¹ / ₂ W ¹ / ₂ ; Sec. 30, Lots 1-4, E ¹ / ₂ , E ¹ / ₂ W ¹ / ₂ ; Sec. 31, Lots 1-4, E ¹ / ₂ , E ¹ / ₂ W ¹ / ₂ ; T. 23 N., R. 11 W., Sec. 10, All; Sec. 11, All; Sec. 13, All, Sec. 14, All.	5,121	4,961	0	160	0	0	c/	50	46	22	3	3.60	2.25	h/	3	5	h/		1 (Abandoned)			6010, 6011	458	
NM-6804	T. 22 N., R. 10 W., Sec. 3, Lots 1-4, S ¹ / ₂ N ¹ / ₂ , S ¹ / ₂ ; Sec. 4, Lots 1-4, S ¹ / ₂ N ¹ / ₂ , S ¹ / ₂ ; Sec. 10, W ¹ / ₂ .	1,602	1,602	0	0	0	0		0	45	0	0	2.05	0	0	7	12	30		0	1,214	76	6010, 6013	106	
NM-7235	T. 23 N., R. 12 W., Sec. 25, NE ¹ / ₄ .	160	0	0	0	160	0		100	2	0	0	0	0	0	0	0	0		0			6010	21	
Kin-Ark NM-11916	T. 24 N., R. 13 W., Sec. 25, All; Sec. 26, All; Sec. 27, All; Sec. 28, E ¹ / ₂ ; Sec. 35, All.	2,880	320	0	2,560	0	0	Underground	17	13	0	0	2.90	0	0	1	9	5	X	0	320	11	6008 (Navajo Indian Irrigation Project)	158	
Thermal- Peabody NM-8715	T. 20 N., R. 7 W., Sec. 3, S ¹ / ₂ ; Sec. 5, Lots 1-4, S ¹ / ₂ N ¹ / ₂ ; Sec. 10, All; Sec. 11, All.	1,921	640	0	960	321	0	Surface	33	8	0	0	1.60	0	h/	h/	1	3		1			6015, 6018, 6019	172	
NM-8717	T. 20 N., R. 5 W., Sec. 35, S ¹ / ₂ , NE ¹ / ₄ , E ¹ / ₂ NW ¹ / ₄ , SW ¹ / ₄ NW ¹ / ₄ .	600	320	0	280	0	0	"	53	14	0	0	0	0	0	0	0	0		0			6023	48	
NM-8128	T. 21 N., R. 8 W., Sec. 8, SE ¹ / ₄ SE ¹ / ₄ ; Sec. 9, S ¹ / ₂ ; Sec. 10, S ¹ / ₂ ; Sec. 15, All; Sec. 17, E ¹ / ₂ ; Sec. 22, W ¹ / ₂ ; Sec. 25, SW ¹ / ₄ ; Sec. 26, W ¹ / ₂ , SE ¹ / ₄ , SW ¹ / ₄ NE ¹ / ₄ ; Sec. 27, Lots 1-4, N ¹ / ₂ , SE ¹ / ₄ ; Sec. 34, Lots 1-8, NE ¹ / ₄ , N ¹ / ₂ SE ¹ / ₄ ; Sec. 35, All.	4,499	1,333	680	1,040	1,446	0	"	18	49	2	0	0	0	0	0	12	19		6 (1 Ancillary, 1 Seasonal Use)			6017, 6018	466	
NM-8129	T. 22 N., R. 9 W., Sec. 19, Lot 4, SE ¹ / ₄ SW ¹ / ₄ ; Sec. 29, NW ¹ / ₄ , W ¹ / ₂ NE ¹ / ₄ ; Sec. 30, Lots 1-4, E ¹ / ₂ , E ¹ / ₂ W ¹ / ₂ ; Sec. 33, S ¹ / ₂ NE ¹ / ₄ , E ¹ / ₂ SW ¹ / ₄ , SE ¹ / ₄ ; Sec. 34, S ¹ / ₂ NW ¹ / ₄ , SW ¹ / ₄ .	1,520	1,520	0	0	0	0	"	0	5	0	1	0.35	1.00	0	4	10	5		0			6013	155	
NM-8130	T. 20 N., R. 7 W., Sec. 6, All; Sec. 7, NE ¹ / ₄ ; Sec. 8, SW ¹ / ₄ ; T. 20 N., R. 8 W., Sec. 1, All; Sec. 2, Lots 1-4, SE ¹ / ₄ NW ¹ / ₄ , S ¹ / ₂ NE ¹ / ₄ ; Sec. 3, Lots 1, 2 Sec. 12, NE ¹ / ₄ .	2,133	973	0	280	880	0	"	38	7	1	0	1.60	0	h/	1	2	7		4 (1 Ancillary)			6018	232	
NM-9764	T. 22 N., R. 10 W., Sec. 21, E ¹ / ₂ SW ¹ / ₄ , SW ¹ / ₄ SW ¹ / ₄ ; Sec. 28, N ¹ / ₂ NW ¹ / ₄ , NW ¹ / ₄ NE ¹ / ₄ .	240	40	0	200	0	0	"	0	3	0	1	0.40	0.15	0	0	0	0		0			6013	23	
NM-11670	T. 21 N., R. 8 W., Sec. 7, Lots 3, 4, E ¹ / ₂ SW ¹ / ₄ ; Sec. 17, W ¹ / ₂ ; Sec. 18, All.	1,119	639	480	0	0	0	"	0	0	0	0	0	0	h/	h/	h/	1		0			6017	130	
United Electric NM-585	T. 19 N., R. 5 W., Sec. 3, S ¹ / ₂ ; Sec. 4, Lots 1, 2, 3, 4, S ¹ / ₂ N ¹ / ₂ , S ¹ / ₂ ; Sec. 5, S ¹ / ₂ ; Sec. 6, Lots 6, 7, E ¹ / ₂ SW ¹ / ₄ , SE ¹ / ₄ ; Sec. 7, Lots 1, 2, E ¹ / ₂ NW ¹ / ₄ , NE ¹ / ₄ ; Sec. 8, N ¹ / ₂ ; Sec. 9, N ¹ / ₂ N ¹ / ₂ , SW ¹ / ₄ NW ¹ / ₄ , SE ¹ / ₄ NE ¹ / ₄ , S ¹ / ₂ N ¹ / ₂ , NW ¹ / ₄ SW ¹ / ₄ , NE ¹ / ₄ SE ¹ / ₄ , SW ¹ / ₄ NE ¹ / ₄ , SE ¹ / ₄ NW ¹ / ₄ , NE ¹ / ₄ SW ¹ / ₄ .	2,811	2,048	0	763	0	0	Surface	100	33	22	1	0	0	0	0	0	0		5 (1 Ancillary)			6023	203	

Notes: a/ Unless otherwise specified by parenthetical note, these sites are currently inhabited.
b/ This estimate applies to the Logical Mining Unit that includes NM-3752, NM-3753, and NM-3754.
c/ This estimate applies to the Logical Mining Unit that includes NM-3755, NM-3918, NM-3919, and NM-8745.
d/ This estimate applies to the Logical Mining Unit that includes NM-3834, NM-3835, NM-3836, NM-3837, NM-3838, NM-6801, NM-6802 and NM-6803.
e/ All PRLAs except NM-6802 involved in underground mining. NM-3835, NM-3836, NM-3837, NM-3838 and NM-6802 involved in surface mining.
f/ This estimate applies to the Logical Mining Unit that includes NM-8715 and NM-8717.
g/ This estimate applies to the Logical Mining Unit that includes NM-8128, NM-8129, NM-8130, NM-9764, and NM-11670.
h/ Data incomplete for these PRLAs.

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APPENDIX A-7

BIRDS OF PREY HABITAT WITHIN THE PRLA AREA

BLM Nest Inventory Number	Species	Applicable Unsuitability Criteria Number	Acres Needed for Protection	PRLA No.	Type of Mine
4A-4B	Ferruginous Hawk	14	220	NM 3835	Surface
5	Ferruginous Hawk	14	640	NM 3919	Surface
6A-6B	Ferruginous Hawk	14	640	NM 3919	Surface
22, 24	Ferruginous Hawk	14	165	NM 11916	Underground
20	Prairie Falcon	13	160	NM 3834	Underground
33-34	Ferruginous Hawk	14	280	NM 3834	Underground

APPENDIX A-8

BIRDS OF PREY HABITAT ON COAL TRACTS OUTSIDE THE PRLA AREA

BLM Nest Inventory Number	Species	Applicable Unsuitability Criteria Number	Acres Needed for Protection	Tract	Type of Mine
19	Ferruginous Hawk	14	115	Bist1 #4	Surface
14	Golden Eagle	11	75	Johnson Trading Post	Surface
25 <u>a/</u>	Ferruginous Hawk	14		Hospah	Surface
29	Golden Eagle	11	280	Nageezi	Underground

a/ Private surface and minerals.

APPENDIX A-9

ACREAGES INCLUDED IN THE NAVAJO LAND SELECTION

THE NAVAJO NATION

WINDOW ROCK, ARIZONA 86515

PETER MacDONALD
CHAIRMAN

The Honorable James G. Watt
Secretary of the Interior
Department of the Interior
C Street between 18th & 19th Streets, N.W.
Washington, D.C. 20240

Subject: Selection of Lands under
P.L. 93-531, as amended.

Dear Secretary Watt:

The Navajo Tribe, pursuant to authority contained in Section 11 of P.L. 93-531, as amended (25 USC Section 640d-10), in consultation with the Navajo and Hopi Indian Relocation Commission, hereby selects for transfer to the Navajo Tribe the lands under the jurisdiction of the Bureau of Land Management within the State of New Mexico as described in Attachment A. This selection includes all surface and subsurface rights to such lands subject only to valid existing rights as of the date of selection.

This selection is made subject to the condition that where any of such lands are subject to existing preferential coal lease applications wherein leases for the mining of coal have not yet been executed by the United States, in the event any such coal lease is executed by the United States and/or the Navajo Tribe after the date of this selection, the royalties and other benefits under such coal lease shall inure the benefit of the Navajo Tribe to be used solely for the benefit of Navajo families residing on Hopi-partitioned lands as provided in the above Act. In the event that this condition cannot be honored as to all or any part of the lands selected we reserve the right to withdraw or amend the selection in whole or in part.

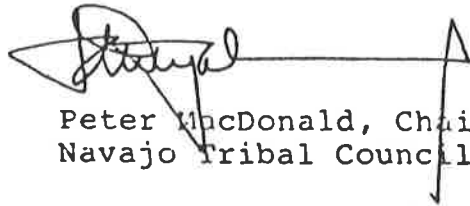
We request that all lands selected herein be withdrawn from disposition under the public land laws pending final disposition of this selection.

Page Two
Secretary James Watt

APR 16 1982

We further request that this selection be acted upon at the secretarial level in the first instance and that the Navajo Tribe and the Navajo and Hopi Indian Relocation Commission be given opportunity to participate in discussion of any problems which may be involved and in the resolution of such problems before any decision is made.

Sincerely,

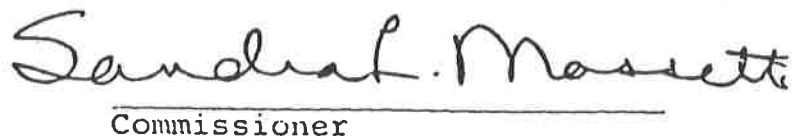


Peter MacDonald, Chairman
Navajo Tribal Council

NAVAJO-HOPI INDIAN
RELOCATION COMMISSION:



Chairman



Commissioner



Commissioner

LEGAL DESCRIPTION OF THE
NEW MEXICO BUREAU OF LAND MANAGEMENT
LANDS LOCATED WITHIN THE PARAGON RANCH
SELECTED BY THE NAVAJO TRIBE

<u>Township 22 North, Range 10 West, NMPM</u>		<u>Acreage</u>
Sec. 4	Lots 1,2,3,4; s $\frac{1}{2}$ N $\frac{1}{2}$; 20 AC (+) within the NW Portion of the NW $\frac{1}{4}$ SW $\frac{1}{4}$	340.84
Sec. 5	A11	640.90
Sec. 6	A11	638.64
Sec. 7	19.75 AC (+) within the NW portion of Lot 1	19.75
<u>Township 22 North, Range 11 West, NMPM</u>		
Sec. 6	Lots 8 thru 15, Inclusive	334.12
Sec. 12	NW $\frac{1}{4}$; N $\frac{1}{2}$ NE $\frac{1}{4}$; SW $\frac{1}{4}$ NE $\frac{1}{4}$; 20 AC (+) within the NW portion of the SE $\frac{1}{4}$ NE $\frac{1}{4}$	300.00
<u>Township 22 North, Range 12 West, NMPM</u>		
Sec. 4	Lots 1,2; S $\frac{1}{2}$ NE $\frac{1}{4}$; S $\frac{1}{2}$	479.28
<u>Township 23 North, Range 10 West, NMPM</u>		
Sec. 19	A11	640.08
Sec. 20	A11	640.00
Sec. 21	S $\frac{1}{2}$, 52 AC (+) within the NW $\frac{1}{4}$	372.00
Sec. 28	N $\frac{1}{2}$, SW $\frac{1}{4}$	480.00
Sec. 29	A11	640.00
Sec. 30	A11	640.72
Sec. 31	A11	640.06
Sec. 33	A11	640.06

Township 23 North, Range 11 West, NTPMAcres

Sec. 6	All	632.57
Sec. 7	Lots 1, 2; E $\frac{1}{2}$ NW $\frac{1}{4}$; NE $\frac{1}{4}$	316.76
Sec. 8	S $\frac{1}{2}$	320.00
Sec. 9	SE $\frac{1}{4}$	160.00
Sec. 18	All	634.16
Sec. 19	Lots 1, 2, 3, 4; E $\frac{1}{2}$ W $\frac{1}{2}$; W $\frac{1}{2}$ E $\frac{1}{2}$	476.04
Sec. 20	E $\frac{1}{2}$ E $\frac{1}{2}$	160.00
Sec. 21	All	640.00
Sec. 22	S $\frac{1}{2}$, NW $\frac{1}{4}$	480.00
Sec. 23	S $\frac{1}{2}$	320.00
Sec. 24	N $\frac{1}{2}$, SE $\frac{1}{4}$	480.00
Sec. 25	NW $\frac{1}{4}$, S $\frac{1}{2}$	480.00
Sec. 26	All	640.00
Sec. 27	All	640.00
Sec. 28	All	640.00
Sec. 33	All	640.00
Sec. 34	All	640.00
Sec. 35	All	640.00

Township 23 North, Range 12 West, NTPM

Sec. 9	Lots 1, 2, 3, 4	170.32
Sec. 12	All	674.32
Sec. 13	All	666.65
Sec. 14	Lots 1 thru 8, Inclusive; NW $\frac{1}{4}$	491.95
Sec. 17	Lots 1, 2, 7, 8, 9, 10, 12, 13	335.65

<u>Township 23 North, Range 12 West, NMPM (Cont'd)</u>		<u>Acreage</u>
Sec. 19	All	654.71
Sec. 20	All	662.30
Sec. 21	All	663.45
Sec. 22	All	661.31
Sec. 23	All	649.63
Sec. 24	All	650.20
Sec. 26	All	640.00
Sec. 28	All	640.00
Sec. 29	All	640.00
Sec. 30	All	635.32
Sec. 34	All	640.00

Township 24 North, Range 11 West, NMPM

Sec. 31	Lots 3, 4; E $\frac{1}{2}$ SW $\frac{1}{4}$	156.48
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Township 24 North, Range 12 West, NMPM

Sec. 25	All	687.48
Sec. 26	Lots 9 thru 16, Inclusive	343.33
Sec. 27	Lots 9 thru 16, Inclusive	342.98
Sec. 28	Lots 9 thru 16, Inclusive	343.10
Sec. 29	Lots 9 thru 16, Inclusive	341.10
Sec. 33	All	687.97
Sec. 34	All	684.11

Township 23 North, Range 11 West, NMPM

Sec. 2	Lots 1, 2, 3, 4; S $\frac{1}{2}$ N $\frac{1}{2}$; S $\frac{1}{2}$	639.36
Sec. 3	Lots 1, 2, 3, 4; S $\frac{1}{2}$ N $\frac{1}{2}$; S $\frac{1}{2}$	638.58

Township 24 North, Range 11 West, NMPMAcreage

Sec. 21	S $\frac{1}{2}$	320.00
Sec. 28	All	640.00
Sec. 33	N $\frac{1}{2}$	320.00
Sec. 34	All	640.00
Sec. 35	All	640.00

Township 23 North, Range 13 West, NMPM

Sec. 14	S $\frac{1}{2}$ N $\frac{1}{2}$; S $\frac{1}{2}$	480.00
Sec. 23	All	640.00
Sec. 24	All	640.00

TOTAL ACREAGE: 35,000.00

APPENDIX A-10

CRITERIA FOR ASSESSING LANDS UNSUITABLE FOR ALL OR CERTAIN STIPULATED METHODS OF COAL MINING

Criterion Number 1: All Federal lands included in the following land systems or categories shall be considered unsuitable: National Park System, National Wildlife Refuge System, National System of Trails, National Wilderness Preservation System, National Wild and Scenic Rivers System, National Recreation Areas, lands acquired with money derived from the Land and Water Conservation Fund, National Forests, and Federal lands in incorporated cities, towns, and villages.

Criterion Number 2: Federal lands that are within rights-of-way or easements or within surface leases for residential, commercial, industrial, or other public purposes. Federally owned surface shall be considered unsuitable.

Criterion Number 3: Federal lands affected by section 522(e)(4) and (5) of the Surface Mining Control and Reclamation Act of 1977 shall be considered unsuitable. This includes lands within 100 feet of the outside line of the right-of-way of a public road or within 100 feet of a cemetery, or within 300 feet of any public building, school, church, community or institutional building or public park or within 300 feet of an occupied dwelling.

Criterion Number 4: Federal lands designated as wilderness study areas shall be considered unsuitable while under review by the Administration and the Congress for possible wilderness designation. For any Federal land which is to be leased or mined prior to completion of the wilderness inventory by the surface management agency, the environmental assessment or impact statement on the lease sale or mine plan shall consider whether the land possesses the characteristics of a wilderness study area. If the finding is affirmative, the land shall be considered unsuitable, unless issuance of noncompetitive coal leases and mining on leases is authorized under the Wilderness Act and the Federal Land Policy and Management Act of 1976.

Criterion Number 5: Scenic Federal lands designated by visual resource management analysis as Class I (an area of outstanding scenic quality or high visual sensitivity) but not currently on the National Register of Natural Landmarks shall be considered unsuitable. A lease may be issued if the surface management agency determines that surface coal mining operations will not significantly diminish or adversely affect the scenic quality of the designated area.

Criterion Number 6: Federal lands under permit by the surface management agency, and being used for scientific studies involving food or fiber production, natural resources, or technology demonstrations and experiments shall be considered unsuitable for the duration of the study, demonstration or experiment, except where mining could be conducted in such a way as to enhance or not jeopardize the purposes of the study, as determined by the surface management agency, or where the principal scientific user or agency gives written concurrence to all or certain methods of mining.

Criterion Number 7: All districts, sites, building, structures, and objects of historic, architectural, archeological, or cultural significance on Federal lands which are included in or eligible for inclusion in the National Register of Historic Places, and an appropriate buffer zone around the outside boundary of the designated property (to protect the inherent values of the property that make it eligible for listing in the National Register) as determined by the surface management agency, in consultation with the Advisory Council on Historic Preservation and the State Historic Preservation Office shall be considered unsuitable.

Criterion Number 8: Federal lands designated as natural areas or as National Natural Landmarks shall be considered unsuitable.

Criterion Number 9: Federally designated critical habitat for threatened or endangered plant and animal species, and habitat for Federal threatened or endangered species which is determined by the Fish and Wildlife Service and the surface management agency to be of essential value and where the presence of threatened or endangered species has been scientifically documented, shall be considered unsuitable.

Criterion Number 10: Federal lands containing habitat determined to be critical or essential for plant or animal species listed by a state pursuant to state law as endangered or threatened shall be considered unsuitable.

Criterion Number 11: A bald or golden eagle nest or site on Federal lands that is determined to be active and an appropriate buffer zone of land around the nest site shall be considered unsuitable. Consideration of availability of habitat for prey species and of terrain shall be included in the determination of buffer zones. Buffer zones shall be determined in consultation with the Fish and Wildlife Service.

Criterion Number 12: Bald and golden eagle roost and concentration areas on Federal lands used during migration and wintering shall be considered unsuitable.

Criterion Number 13: Federal lands containing a falcon (excluding kestrel) cliff nesting site with an active nest and a buffer zone of Federal land around the nest site shall be considered unsuitable. Consideration of availability of habitat for prey species and of terrain shall be included in the determination of buffer zones. Buffer zones shall be determined in consultation with the Fish and Wildlife Service.

Criterion Number 14: Federal lands which are high priority habitat for migratory bird species of high Federal interest on a regional or national basis, as determined jointly by the surface management agency and the Fish and Wildlife Service, shall be considered unsuitable.

Criterion Number 15: Federal lands which the surface management agency and the state jointly agree are fish and wildlife habitat for resident specie of high interest to the state and which are essential for maintaining these priority wildlife species shall be considered unsuitable. Examples of such lands which serve a critical function for the species involved include:

- (i) Active dancing and strutting grounds for sage grouse, sharp tailed grouse, and prairie chicken;
- (ii) Winter ranges most critical for deer, antelope, and elk; and
- (iii) Migration corridors for elk.

A lease may be issued if, after consultation with the state, the surface management agency determines that all or certain stipulated methods of coal mining will not have a significant long-term impact on the species being protected.

Criterion Number 16: Federal lands in riverine, coastal and special floodplains (100-year recurrence interval) on which the surface management agency determines that mining could not be undertaken without substantial threat of loss of life or property shall be considered unsuitable for all or certain stipulated methods of coal mining.

Criterion Number 17: Federal lands which have been committed by the surface management agency to use as municipal watersheds shall be considered unsuitable.

Criterion Number 18: Federal lands with National Resource Waters, as identified by states in their water quality management plans, and a buffer zone of Federal lands 1/4 mile from the outer edge of the far banks of the water, shall be unsuitable.

Criterion Number 19: Federal lands identified by the surface management agency, in consultation with the state in which they are located, as alluvial valley floors according to the definition in § 3400.0-5(a) of this title, the standards in 30 CFR Part 822, the final alluvial valley floor guidelines of the Office of Surface Mining.

Reclamation and Enforcement when published, and approved state programs under the Surface Mining Control and Reclamation Act of 1977, where mining would interrupt, discontinue, or preclude farming, shall be considered unsuitable. Additionally, when mining Federal land outside an alluvial valley floor would materially damage the quantity or quality of water in surface or underground water systems that would supply alluvial valley floors, the land shall be considered unsuitable.

Criterion Number 20: Federal lands in a state to which is applicable a criterion (i) proposed by that state, and (ii) adopted by rulemaking by the Secretary, shall be considered unsuitable.

APPENDIX A-11

CULTURAL RESOURCE INVENTORY PROCEDURES AND CONSULTATION

In November, 1982 the Bureau of Land Management (BLM) released the Draft San Juan River Regional Coal Environmental Impact Statement (EIS) discussing the environmental, social and economic impacts of the proposed mining of 39 new competitive coal tracts in northwestern New Mexico. Subsequent to the release of this document, it was determined that additional inventory was needed to more accurately assess the impacts of mining on cultural resource values on 27 of these tracts. On June 19, 1983 the BLM began an in-house inventory to collect additional data on 18 of the highest priority tracts: Gallow Wash #1 and #2, Star Lake East #1, Star Lake East (Low Confidence), Johnson Trading Post, Bisti #4, La Plata #1, #2, #3, and #4, Samson Lake #1 and #2, Gomerco #1 and #2, Twin Buttes, Ta-ha-bah Well, Crownpoint Northeast, and Crownpoint East. The inventories conducted on the Twin Buttes and Crownpoint East tracts were only for a portion of these tract. The reduced acreage was determined according to the BLMs Branch of Solid Minerals most current information on coal resources.

Portions of the Lee Ranch Middle and Divide tracts were surveyed by the School of American Research. Other tracts in which the amount of available information is considered to be incomplete under the existing regulations and were not included in this inventory are Pinehaven, Lee Ranch East, Breadsprings #1 and #2, Hogback, Chico Wash South and Gomerco #2 (refer to Preface page ix).

The goals of these inventories were three-fold: 1) to gather sufficient data to characterize cultural resources for all of the acreage overlying federal mineral estate; 2) to apply Unsuitability Criterion #7 (43 CFR 3461.1(g)(1) to sites located within the tract; and 3) to the degree possible, assess overall suitability of the tract for leasing based on the potential for severe conflicts with cultural resource values. To achieve these goals, sample inventory procedures were used.

The School of American Research previously conducted a large amount of inventory in the vicinity of the Divide and Lee Ranch Middle tracts. Drawing upon this experience, Beal (1983) devised a predictive model based on land forms. The tracts were then stratified according to land forms and a judgemental sample was defined, biased toward land forms where cultural resources are most likely to occur: 50 percent coverage of ridgetop, hilltop, and elevated areas, 15 percent coverage of slopes and benches, and only incidental coverage of valley bottoms, drainages, and floodplains. The survey areas were inventoried to BLM Class III standards.

Little existing information was available for the tracts inventoried by the BLM archaeologists. Because of this, no attempt was made to stratify the inventory area. Instead an unbiased sample of interval transects was surveyed. Survey transects were placed at 150 to 200 meter intervals, designed to achieve a minimum of 10 to 15 percent coverage. Although this percentage is relatively small, a much larger percentage of the total sites potentially unsuitable for coal leasing within each tract were probably recorded. Such sites are generally apt to be larger in area and visually more prominent from a distance. In the course of inventory, transect coverage was supplemented by reconnaissance where

potentially unsuitable sites were suspected or observed. However, this supplemental reconnaissance was not systematic, and in no context should this inventory be considered to represent intensive (BLM Class III) coverage of these tracts.

Field reports providing additional detail about methods and results of these projects are on file at the BLM Farmington Resource Area Office. These reports are:

BLM Competitive Coal Tract Cultural Resource Inventory Intrim Report,
Bisti #4 Tract, by John Roney and John Stein.

BLM Competitive Coal Tract Cultural Resource Inventory Intrim Report,
Crownpoint East Tract, by John Roney.

BLM Competitive Coal Tract Cultural Resource Inventory Intrim Report,
Gallo Wash #1 Tract, by John Roney and Chris Kincaid.

BLM Competitive Coal Tract Cultural Resource Inventory Intrim Report,
Gallo Wash #2 Tract, by Sam Ball and John Roney.

BLM Competitive Coal Tract Cultural Resource Inventory Intrim Report,
Gamerco Tract, by Andrew Fowler.

BLM Competitive Coal Tract Cultural Resource Inventory Intrim Report,
Johnson Trading Post Tract, by Andrew Fowler.

BLM Competitive Coal Tract Cultural Resource Inventory Intrim Report,
La Plata #1, #2, #3, and #4 Tracts, by Lou Ann Jacobson.

BLM Competitive Coal Tract Cultural Resource Inventory Intrim Report,
Sampson Lake Tract, by T. J. Ferguson.

BLM Competitive Coal Tract Cultural Resource Inventory Intrim Report,
Star Lake East Tract, by T. J. Ferguson.

BLM Competitive Coal Tract Cultural Resource Inventory Intrim Report,
Tah-ha-bah Tract, by T. J. Ferguson.

BLM Competitive Coal Tract Cultural Resource Inventory Intrim Report,
Twin Buttes Tract, by Andrew Fowler.

A Predictive Sample Survey in the Southern San Juan Basin, Preliminary
Report, by John D. Beal, School of American Research.

A total of 293 previously unrecorded components were recorded during the inventories:

Lithic	53	18.1%
Anasazi	54	18.4%
Navajo	145	49.5%
Anglo/Hispanic	10	3.4%
Unknown	32	10.6%
Total	<u>294</u>	<u>100.0%</u>

Due to time constraints and the limited goals of this inventory, no testing was done to determine the nature and extent of subsurface deposits. This limitation led to a conservative approach in assessing eligibility for the National Register of Historic Places (NRHP). In cases where the presence of subsurface deposits may have been the determining factor in site eligibility, sites were automatically recommended as eligible.

For Navajo sites our evaluation centered around whether or not the site could be most profitably investigated by ethnographic/ethnohistoric or archaeological techniques. For example, if the site were post WWII and near an occupied outfit, the assumption was made that ethnohistoric investigation would yield better more useful data than archaeological investigation; the site was therefore not recommended as eligible for the NRHP. This assumption was checked where possible by contracting local residents.

If a Navajo site contained cultural material suggesting a date around the turn of the century or earlier, the assumption was made that archaeological techniques would be more profitable, and these sites were recommended as eligible. This kind of evaluation was made exclusive of any reference to the quality, quantity and preservation of features on the site itself.

Pre-historic sites were evaluated on the basis of surface appearance of features, variety of artifactual remains, potential depth, complexity, integrity and uniqueness of this site with respect to others in the same vicinity.

Under the procedures, 157 components are identified as potentially eligible for the National Register of Historic Places. However, almost all of these are potentially eligible because they may yield information important in history or prehistory (criterion d). Consequently potential adverse impacts could be mitigated under a mine plan for coal development through data recovery. Therefore, these projects may be considered exceptions to Unsuitability Criterion 7.

Two new areas were found which are recommended as unsuitable under Criterion #7. One of these is a Chacoan shrine (LA44728,a) with standing masonry walls. This site is a well preserved example of a highly unusual form of Anasazi architecture and clearly warrants in-situ preservation. An area of 160 acres is recommended as unsuitable to preserve the site. In addition, special stipulations may be needed to prevent further reduction of the fragile, unstabilized masonry walls during mining operations.

The other area recommended as unsuitable is a 280 acre parcel which contains a large pithouse village dating to Basketmaker III and Early Pueblo I times, as well as several segments of the prehistoric South Road.

After completion of the inventories the BLM provided copies of the field reports to the Bureau of Indian Affairs, as a cooperating agency and to the State Historic Preservation Officer. Following a review period, a meeting was held with each of these parties to discuss the adequacy of the information base, eligibility of the sites that were found, and application of Unsuitability Criterion #7. This EIS reflects the agreements which were reached, subject to the following concerns.

First, it is possible that some cultural resources will be of special significance to local Native American people, thus deriving importance from factors which are not apparent during a standard archaeological resources inventory. Presently three such situations are known in the San Juan Basin. To address this possibility, the lessee will conduct an ethnographic survey specifically directed toward identification of properties which have special significance to local Native American people, which should be considered further in the light of Federal historic preservation mandates. Results of this survey will be used in the development of special tract specific lease stipulations.

The BLM also recognizes that eventual mining on the coal tracts would affect a sizeable fraction of the archeological sites in the EIS Region. Even though adverse effects would be mitigated through state-of-the-art data recovery, a large number of sites would become unavailable for future research. This is considered acceptable because other, similar properties exist outside the proposed coal leasing tracts and will not be affected. To ensure that similar cultural resources are preserved outside the coal leasing tracts the BLM is compiling a list of equivalent sites arranged by site types. This listing will be added to the BLMs land use planning data base and provided to other surface managing agencies, to allow monitoring of the pool of equivalent properties as other surface disturbing projects are proposed. If the numbers of a particular class of sites dwindle to critical levels, specific properties could then be identified for preservation.

The New Mexico State Historic Preservation Officer has expressed concern that buried sites may not be readily identified during intensive (Class III) inventories required for mine plan preparation. This is a problem because buried sites often include critical information which is not preserved on surficial, deflated sites. If intensive inventories show a strong possibility of buried, unrecorded sites, lessees may be required to monitor topsoil removal in critical areas. Historic properties found during topsoil removal would be subject to data recovery.

Finally, the determination that present levels of information are adequate for the purpose of 106 consultation and application of Unsuitability Criterion #7 is based on the premise that lease stipulations will unambiguously provide for in-place preservation of cultural resources, if adequate mitigating measures can not be devised.

Requirements for consultation with the Advisory Council have been fulfilled under provisions of the Programmatic Memorandum of Agreement, Interagency Agreement No. NMSO-168 among the BLM, New Mexico State Historic Preservation Officer, and Advisory Council on Historic Preservation.

APPENDIX B

WATER RESOURCES

APPENDIX B-1

APPROXIMATE FLOODPLAIN ACREAGES ON SURFACE MINEABLE COAL TRACTS^{a, b/}

Coal Tract	Major Drainageway(s) (including tributaries)	Acreage
La Plata #1	N/A	0
La Plata #3	N/A	0
Johnson Trading Post	San Isidro Wash	190
Star Lake East #1	Salazar and Papers Washes,	75
Star Lake West #2	Arroyo Pueblo Alto	16
Kimbeto #2	Betonnie Tsosie Wash	180
Gallo Wash #1	N/A	0
Bist1 #1	Alamo and De-na-zin Washes, and Coal Creek	460
Bist1 #2	Hunter Wash	87
Bist1 #4	N/A	0
Bist1 #6 and #8	N/A	0
Lee Ranch East	N/A	0
Lee Ranch Middle	San Isidro, Doctor, and Tinaja Arroyos, Mulatto Canyon Creek, and Voght Draw	948
Lee Ranch West	Canyon Largo and Mulatto Canyon Creeks, and Arroyos Leon and Tinaja	412
Divide	Canada Marcelina and Milpitas Draw	513
Crownpoint Northeast	Indian Creek and Kim-me-ni-oli Wash	400
Crownpoint East (LC & HC)	Kim-me-ni-oli Wash	405
Hospah #1	Inditos Draw and Kim-me-ni-oli Wash	509
Chico Wash South	Arroyos Chico, La Azabache and Seccion	315
Catalpa Canyon	N/A	0
Pinehaven	White Water Arroyo	380
Twin Buttes	Twin Buttes Wash	36
Hogback	Catalpa Canyon and Peretti Canyon Creeks	37
Sundance	N/A	0
Bread Springs #1	N/A	0
Gamerco #1 (LC)	N/A	0
Gamerco #1 (HC)	N/A	0
Samson Lake #2 (LC & HC)	Samson Lake	15
TOTAL		4,978

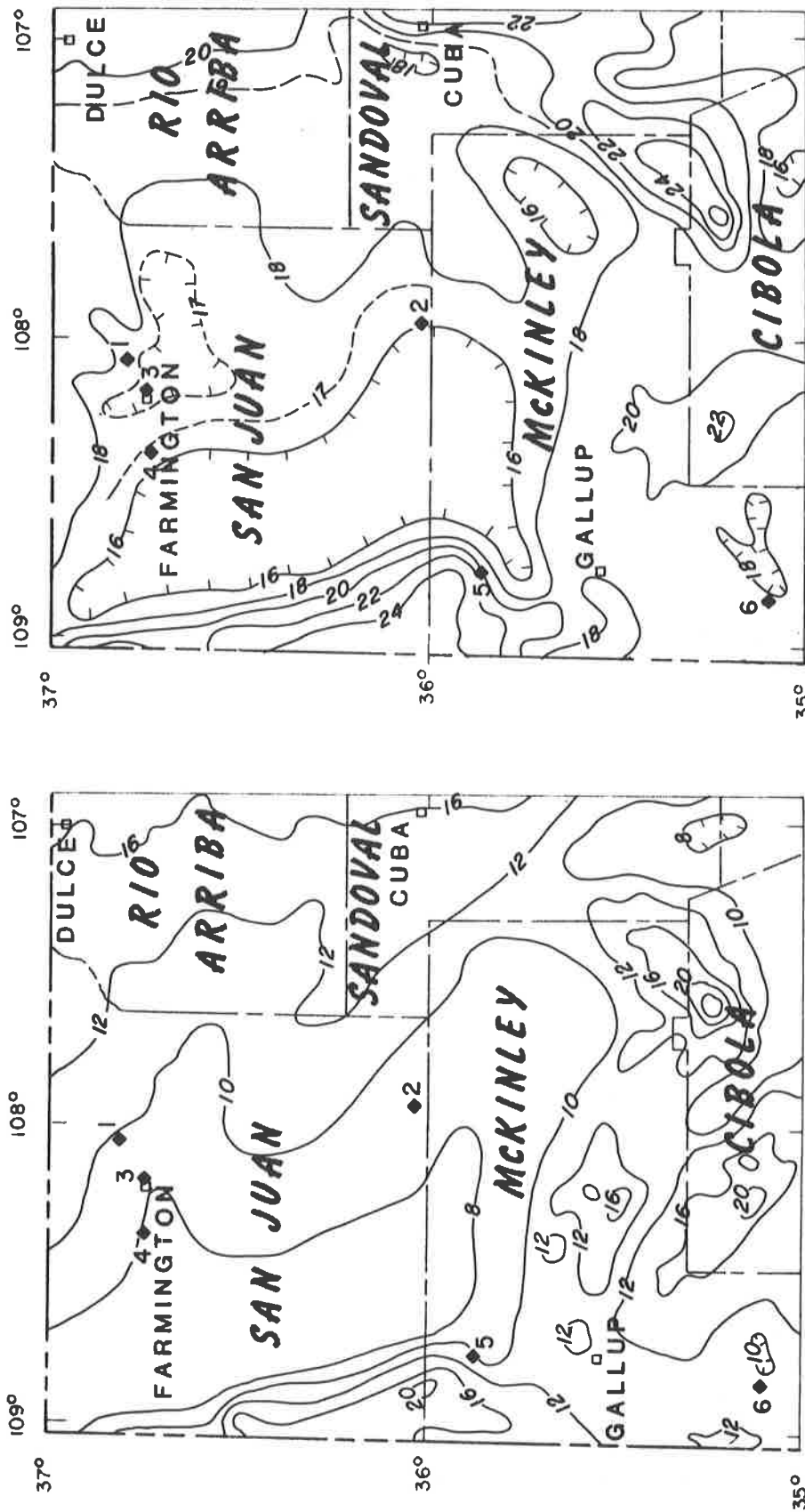
Source: U.S. Dept. of Housing and Urban Development, Federal Insurance Administration, 1977, 1978, and 1980. (Acreages computed with dot grid, using Flood Hazard Boundary Maps).

Notes: ^{a/} Maps showing the areal distribution of these floodplains were presented in the Site-Specific Analysis prepared for each tract (USDI, BLM, 1982).

^{b/} Floodplain acreages on PRLA tracts are presented in Appendix F-12 of Final Environmental Assessment For Coal Preference Right Leasing New Mexico (USDI, BLM, 1981).

APPENDIX B-1

concluded



LINE OF EQUAL AVERAGE ANNUAL PRECIPITATION, IN INCHES (1931-60)

LINE OF EQUAL 10-YEAR 24-HOUR PRECIPITATION, IN TENTHS OF AN INCH

Source: USDA, SCS 1974

Source: USDA, SCS 1967

Average precipitation, in inches (1941-70)

Station	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1 AZTEC RUINS NAT MON	0.75	0.64	0.71	0.70	0.60	0.48	0.87	1.29	0.90	1.17	0.54	0.89	9.54
2 CHACO CANYON NAT MON	0.43	0.45	0.62	0.51	0.60	0.44	1.09	1.39	1.07	1.01	0.46	0.69	8.76
3 FARMINGTON 4 NE	0.54	0.46	0.52	0.60	0.47	0.46	0.78	1.18	0.85	1.08	0.47	0.66	8.07
4 FRUITLAND 2 E	0.53	0.41	0.50	0.59	0.46	0.36	0.75	1.03	0.85	1.03	0.47	0.66	7.64
5 TOHATCHI 1 ESE	0.59	0.50	0.66	0.55	0.53	0.41	1.59	2.00	1.18	1.10	0.49	0.81	10.41
6 ZUNI FAA AIRPORT	0.85	0.66	0.90	0.58	0.36	0.40	1.78	2.09	1.16	1.15	0.59	0.81	11.33

Figure B-1. Average annual and 10-year 24-hour precipitation.

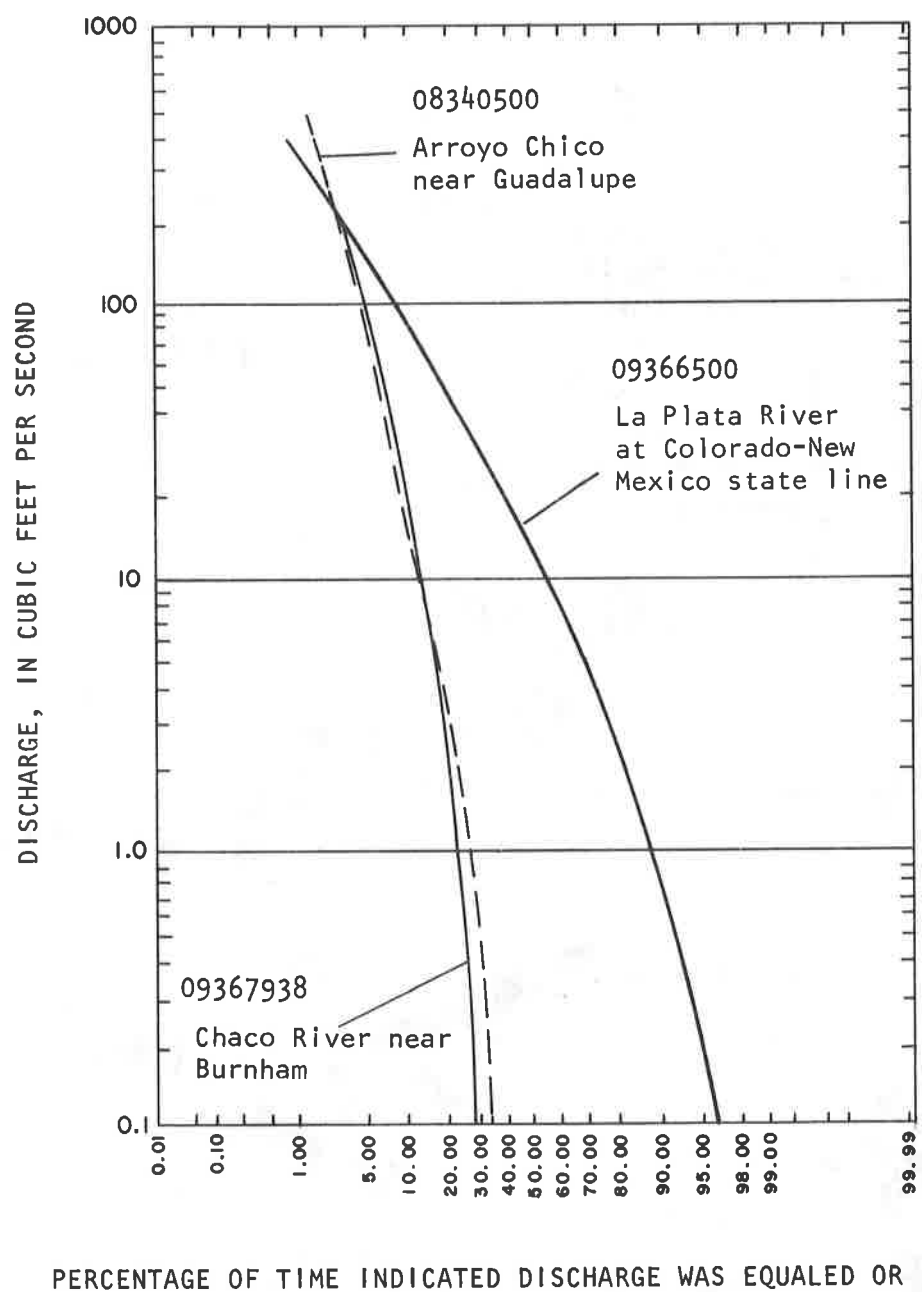


Figure B-2. Flow-duration curves for selected gaging stations.

APPENDIX B-3

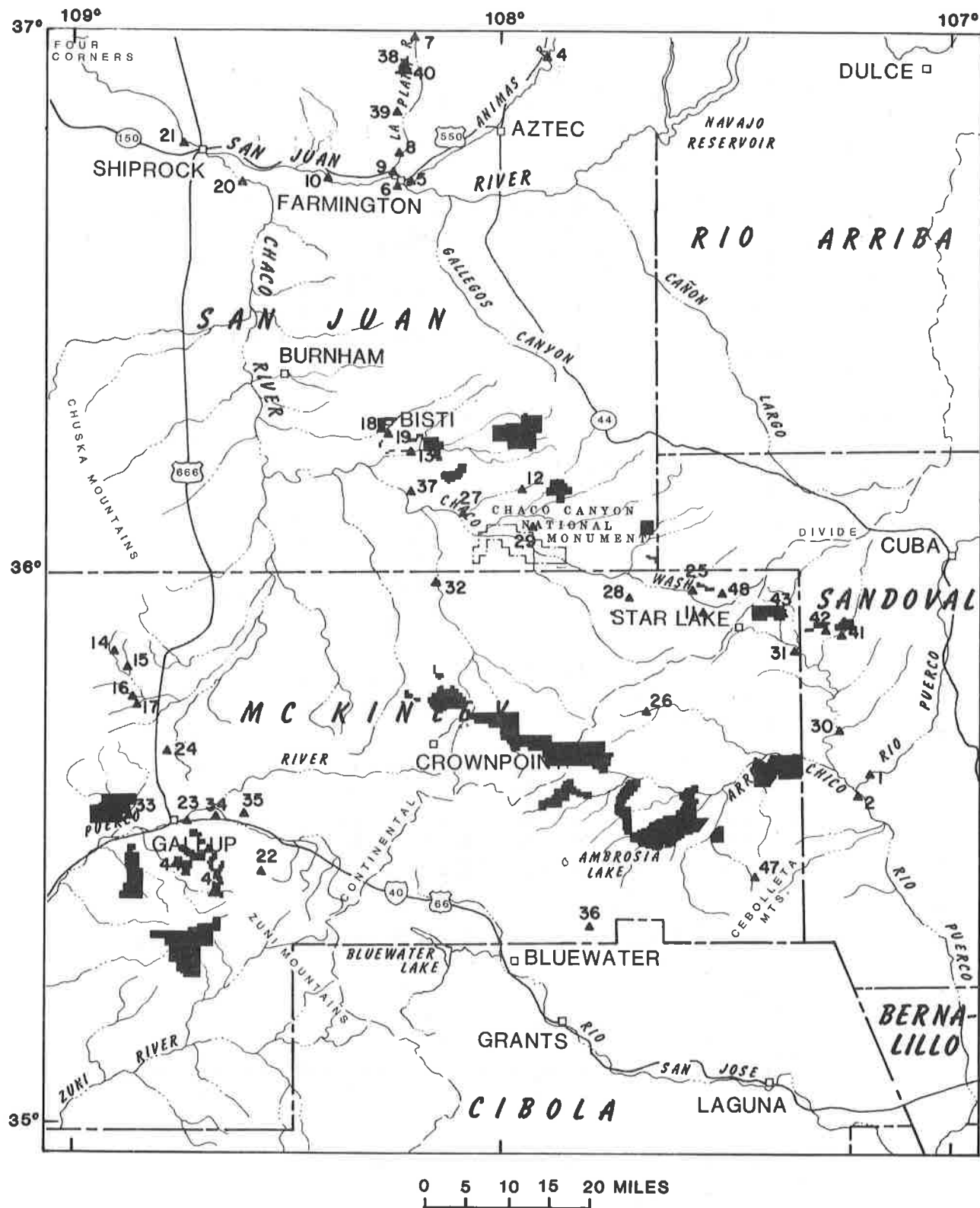


Figure B-3. Location of selected surface-water sites.

APPENDIX B-4

Table B-4 Streamflow characteristics for selected surface-water sites

Number on figure B-3	Station number	Site name	Latitude	Longitude	Drainage area (mi ²)	Flood magnitude, in cubic feet per second, for indicated recurrence interval, in years					Average annual discharge (ft ³ /sec)
						2	5	10	25	50	
1	08334000	RIO PUERCO ABV ARROYO CHICO, N.M.	353808	1070956	420	2,290	3,460	4,260	5,290	6,070	13.4
2	08340500	ARROYO CHICO NR GUADALUPE, N.M.	353533	1071119	1,390	4,970	7,680	9,580	12,100	14,000	21.3
4	09363500	ANIMAS RIVER NR CEDAR HILL, N.M.	370217	1075225	1,090	5,710	8,100	9,730	11,800	13,500	898
5	09364500	ANIMAS RIVER AT FARMINGTON, N.M.	364312	1081208	1,360	5,980	9,030	11,200	14,000	16,300	919
6	09365000	SAN JUAN R AT FARMINGTON, N.M.	364322	1081330	7,240	7,930	11,100	13,200	15,800	17,600	2,373
7	09366500	LA PLATA R AT CO-N.M. STATE LINE	365951	1081117	331	750	1,570	2,310	3,480	4,540	34.9
8	09367400	LA PLATA R TRIB NR FARMINGTON	364710	1081331	1.03	57	222	451	952	1,540	0.03
9	09367500	LA PLATA R NR FARMINGTON, N.M.	364423	1081451	583	1,330	2,240	2,900	3,780	4,470	26.9
10	09367540	SAN JUAN R NR FRUITLAND, N.M.	364425	1082409	8,010	9,740	17,000	24,700	32,000	38,000	2,540
11	09367660	CHACO WASH NR STAR LAKE T.P., N.M.	355607	1073139	59.0	56	110	160	220	275	0.93
12	09367685	AH-SHI-SLE-PAH WASH NR KIMBETO, N.M.	360918	1075647	8.2	463	802	1,070	1,460	1,790	-
13	09367710	DE-NA-ZIN WASH NR BISTI T.P., N.M.	361351	1081157	184	1,390	1,930	2,280	2,700	3,000	-
14	09367840	YAZZIE WASH NR MEXICAN SPRGS, N.M.	355040	1085300	2.1	315	614	867	1,250	1,580	0.29
15	09367860	CHUSCA WASH NR MEXICAN SPRGS, N.M.	354840	1085050	8.7	1,110	2,410	3,590	5,490	7,230	0.38
16	09367880	CATRON WASH NR MEXICAN SPRGS, N.M.	354615	1084940	26.9	1,730	3,000	4,000	5,410	6,590	1.19
17	09367900	BLACK SPRGS WASH NR MEXICAN SPRGS, N.M.	354540	1084900	7.05	453	1,050	1,620	2,590	3,490	0.26
18	09367930	HUNTER WASH AT BISTI T.P., N.M.	361637	1081512	45.6	797	1,480	2,010	2,740	3,320	-
19	09367932	HUNTER WASH TRIB NR BISTI T.P., N.M.	361533	1081506	8.47	183	475	771	1,290	1,820	-
20	09367950	CHACO RIVER NR WATERFLOW, N.M.	364328	1083527	4,350	2,830	7,070	11,400	18,800	25,900	65.2
21	09368000	SAN JUAN R AT SHIPROCK, N.M.	364732	1084354	12,900	15,100	25,800	34,200	46,300	56,300	2,193
22	09395400	MILK RANCH CANYON NR FT WINGATE, N.M.	352555	1083330	14.0	63	188	336	626	938	1.10
23	09395500	PUERCO RIVER AT GALLUP, N.M.	353145	1084441	558	3,150	5,640	7,630	10,500	12,900	16.0
24	09395600	WAGON TRIAL WASH NR GAMERCO, N.M.	353900	1084700	0.42	70	177	287	481	670	-
25		ARROYO PUEBLO ALTO	355812	1073142	2.54	75	192	310	517	720	0.05
26		SANDOVAL ARROYO	354442	1073811	26.5	243	557	847	1,330	1,790	0.22
27		AH-SHI-SLE-PAH WASH	360614	1080514	43.1	399	945	1,460	2,330	3,180	0.67
28		PUEBLO PINTADO CANYON	355817	1073949	7.1	134	332	526	859	1,190	0.14
29		ESCAVADA WASH	360558	1075523	89.3	534	1,200	1,800	2,790	3,750	1.62
30		ARROYO PIEDRA LUMBRA	354147	1071309	78.0	499	1,130	1,700	2,650	3,560	2.19

Table B-4 Streamflow characteristics for selected surface-water sites - Concluded

Number on figure B-3	Station number	Site name	Latitude	Longitude	Drainage area (mi ²)	Flood magnitude, in cubic feet per second, for indicated recurrence interval, in years					Average annual discharge (ft ³ /sec)
						2	5	10	25	50	
31		PAPERS WASH	355129	1071832	69.1	420	932	1,390	2,140	2,870	0.19
32		KIM-ME-NI-OLI WASH TRIB	355814	1080818	34.3	337	798	1,230	1,960	2,680	0.25
33		BURNED DEATH WASH	353144	1085147	53.3	383	869	1,310	2,040	2,750	1.90
34		PUERCO RIVER	353208	1084000	278	845	1,750	2,520	3,740	4,890	8.90
35		S. FK. PUERCO R TRIB	353143	1083614	11.2	157	375	584	935	1,280	0.57
36		ARROYO DEL PUERTO	352015	1074742	93.8	456	979	1,440	2,180	2,880	1.12
37		ROCK WASH	360913	1081247	4.6	12	37	65	116	169	0.10
38		MURPHY ARROYO TRIB	365650	1081402	0.2	14	41	70	126	184	0.01
39		PUMP CANYON	365102	1081403	0.4	12	37	65	116	169	0.02
40		MURPHY ARROYO	365619	1081258	5.8	34	94	157	270	384	0.38
41		SAN ISIDRO WASH	355327	1071242	64.1	856	1,890	2,800	4,200	5,440	1.89
42		SAN ISIDRO WASH TRIB	355405	1071442	0.6	14	41	70	126	184	0.02
43		PAPERS WASH TRIB	355535	1072108	3.7	14	41	70	126	184	0.13
44		BREAD SPRINGS WASH TRIB	352625	1084409	1.3	40	109	181	309	483	0.11
45		BREAD SPRINGS WASH	352403	1083953	6.9	193	473	743 ^a	1,180	1,600	0.76
46		DEFIANCE DRAW	353052	1085216	119	498	1,140	1,730	2,650	3,480	3.67
47		SALAZAR WASH (HEADWATERS)	352437	1072446	1.9	25	71	120	208	299	0.02
48		UNNAMED TRIB OF GAS TANK WASH	355743	1072812	.01	4	13	24	45	68	0.0

APPENDIX B-5

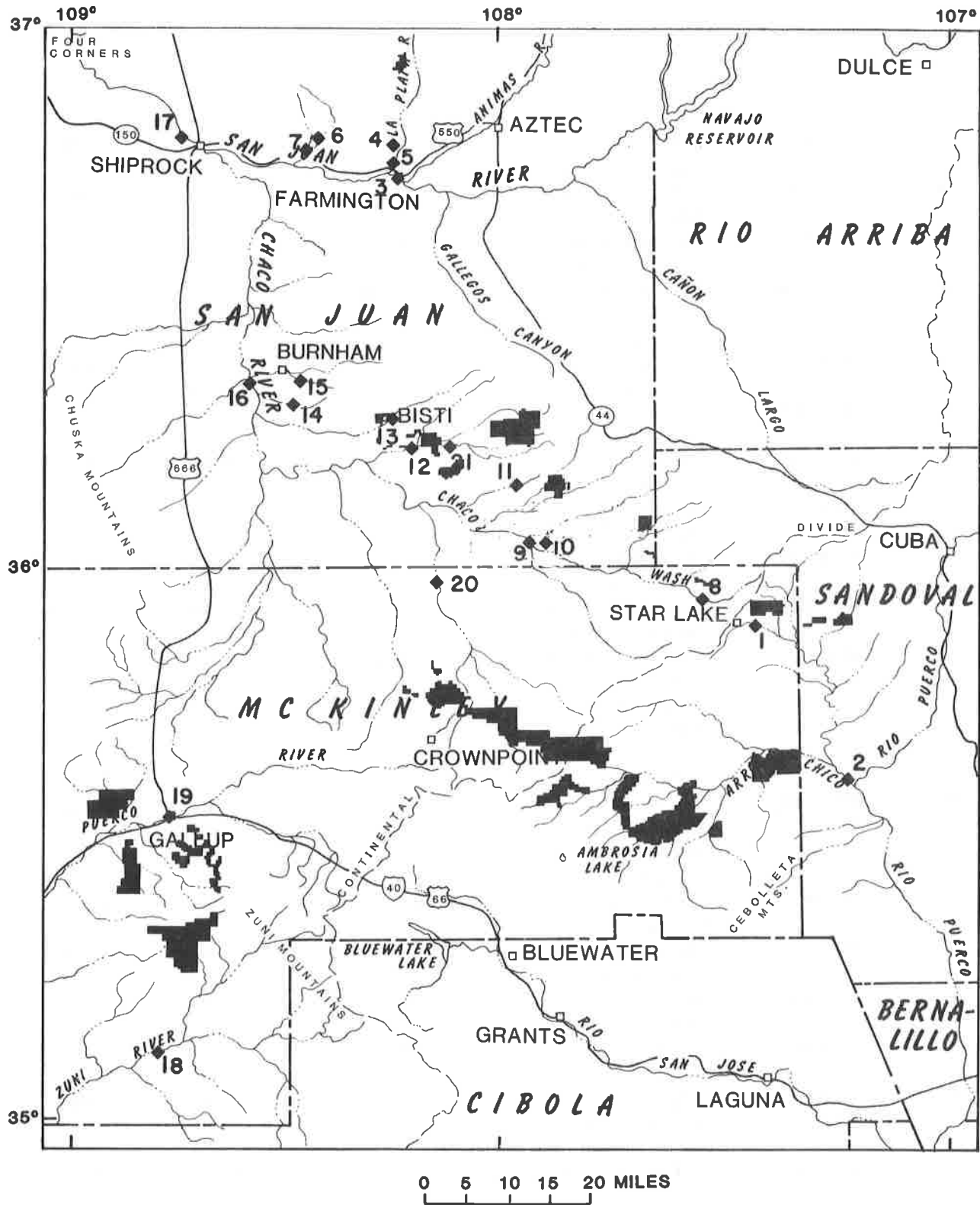


Figure B-5. Location of selected water-quality gaging stations.

Number on figure	Station number	Station name	Drainage area (square miles)	Period of record	
				Chemical quality	Suspended sediment
1	08334300	Papers Wash near Star Lake T.P.	20.3	1978-	1978-
2	08340500	Arroyo Chlico near Guadalupe	1,390	-	1948-56 1978-
3	09365000	San Juan River at Farmington	7,240	1962-	1979-
4	09367400	La Plata River tributary near Farmington	1.03	1979-	1979-
5	09367500	La Plata River near Farmington	583	1970-73 1978-	1978-81
6	09367555	Shumway Arroyo near Fruitland	62.8	1976-	1976-
7	09367561	Shumway Arroyo near Waterflow	73.8	1975-	1975-
8	09367660	Chaco Wash near Star Lake T.P.	59.0	1978-	1978-
9	09367680	Chaco Wash at Chaco Canyon N. Mon.	578	1976-	1976-
10	09367682	Gallo Wash at Chaco Canyon N. Mon.	36.2	1979-81	1979-81
11	09367685	Ah-shi-sie-pah Wash near Kimbeto	8.21	1977-	1977-
12	09367710	De-na-zin Wash near Bisti T.P.	184	1976-	1976-
13	09367930	Hunter Wash at Bisti T.P.	45.6	1975-	1975-
14	09367934	Teec-ni-di-tso Wash near Burnham	7.2	1978-	1978-
15	09367936	Burnham Wash near Burnham	8.6	1978-	1978-
16	09367938	Chaco River near Burnham	3,640	1978-	1978-
17	09368000	San Juan River at Shiprock	12,900	1941-45 1951-	1951-
18	09386950	Zuni River above Black Rock Res.	810	1978-	1979-
19	09395500	Puerco River at Gallup	558	1975-	1980-
20	355841- 108081810	Kim-me-ni-oll Wash near Chaco Canyon N. Mon.	-	1978-	1978-
21	361404- 108074710	Coal Creek above Tanner Lake near Bisti T.P.	47.5	1975	1975-77

Source: Modified from Hejl (1982)

APPENDIX B-6

Table B-6. Results of chemical analyses of streamflow at selected gaging stations

All data are provisional and subject to revision. All values are the mean for the period of record. All chemical concentrations are expressed in milligrams per liter. Specific conductance is given in micromhos per centimeter at 25 degrees Celsius. pH is given in units. *indicates the value is based on one sample.

Number on figure B-5	Station name	Specific conductance	pH, range and mean	Calcium, dissolved	Magnesium, dissolved	Sodium, adsorption ratio	Potassium, dissolved	Alkalinity, (as CaCO ₃)	Sulfate, dissolved	Chloride, dissolved	Fluoride, dissolved	Sediment, suspended
1	08334300 Papers Wash near Star Lake T.P.	309	7.0-8.9 7.8	10	0.9	4	3	130	6.2	10	0.5	5,950
2	08340500 Arroyo Chico near Guadalupe	1,200	8.8*	50*	11*	25*	4*	340*	1,300*	54*	1.1*	32,000
3	09365000 San Juan River at Farmington	514	6.9-8.9 7.2	56	8.6	1	2	110	140	9.5	0.3	789
4	09367400 La Plata River tributary near Farmington	1,040	6.6-8.2	100	11	10	3	140	540	6.1	0.7	135,000
5	09367500 La Plata River near Farmington	2,320	7.7-8.6 8.3	200	82	4	4	220	990	94	0.5	3,690
6	09367555 Shumway Arroyo near Fruitland	1,430	7.0-7.6 7.2	37	7.3	4	8	62*	220	10	0.8	224,000
7	09367561 Shumway Arroyo near Waterflow	6,790	2.4-10.4 7.4	340	190	17	15	160	3,900	350	5.9	13,600
8	09367660 Chaco Wash near Star Lake T.P.	589	6.8-8.8 7.5	9.3	0.7	7	3	130	73	11	0.5	17,700
9	09367680 Chaco Wash at Chaco Canyon N. Mon.	465	6.3-8.5 7.6	21	2.2	6	4	170	71	7.7	0.8	29,700
10	09367682 Gallo Wash at Chaco Canyon N. Mon.	432	7.1-8.3 7.8	16*	1.7*	3*	7*	80*	56*	7.8*	0.2*	2,570
11	09367685 Ah-shi-sie-pah Wash near Kimbeto	823	6.6-8.6 7.6	7.6	0.8	13	4	190	170	23	0.5	51,200

Table B-6. Results of chemical analyses of streamflow at selected gaging stations - Concluded

Number on figure Station B-5	Station name	Specific conduct- ance	pH, range and mean	Cal- cium, dis- solved	Mag- nesium, dis- solved	Sodium, dis- solved	Sodium adsorp- tion ratio	Potas- sium, dis- solved	Alka- linity, (as CaCO ₃)	Sul- fate, dis- solved	Chlo- ride, dis- solved	Fluo- ride, dis- solved	Sedi- ment, sus- pended
12	09367710 De-na-zin Wash near Bisti T.P.	718	6.5-8.5 7.8	8.6	0.6	140	14	3	180	130	7.0	1.2	53,400
13	09367930 Hunter Wash at Bisti T.P.	1,060	6.8-9.8 7.7	23	2.4	190	12	6	170	290	12	0.1	51,900
14	09367934 Teec-ni-di-tso Wash near Burnham	489	8.0-9.3 8.6	4.4	0.6	93	11	2	160	96	8.1	0.8	19,900
15	09367936 Burnham Wash near Burnham	770	7.3-9.3 8.1	11	3.3	150	11	4	240	160	8.8	0.8	102,000
16	09367938 Chaco River near Burnham	1,170	6.7-8.9 8.1	16	1.6	130	10	3	250	150	8.6	0.8	58,100
17	09368000 San Juan River at Shiprock	672	7.0-9.0 8.1	68	14	56	2	3	120	210	14	0.4	9,490
18	09386950 Zuni River above Black Rock Res.	650	7.7-8.4 8.1	52	19	62	2	4	180	100	17	0.3	355
19	09395500 Puerco River at Gallup	1,080	3.4-8.9 8.0	40	18	160	6	5	230	330	28	0.7	24,400
20	355841- Kim-me-ni-oli 108081810 Wash near Chaco Canyon N. Mon.	1,720	7.4-9.0 8.2	16	2.1	510	33	5	310	720	82	1.7	4,540
21	361404- Coal Creek above 108074710 Tanner Lake near Bisti T.P.	1,640	6.9-8.1 7.2	17	1.4	120	8	4	160	120	6.5	1.0	38,300

B-6

Table B-7. Results of trace-element analyses of streamflow at selected gaging stations

All data are provisional and subject to revision. All values are the mean for the period of record. All concentrations are expressed in micrograms per liter. * indicates the value is based on one sample. ** indicates the concentration is reported to the nearest 1/2 microgram.

Number on figure B-5	Station number	Station name	Boron, dissolved	Iron, dissolved	Manganese, dissolved	Chromium, dissolved	Aluminum, dissolved	Mercury, dissolved **	Selenium, dissolved	Strontium, dissolved	Zinc, dissolved
3	09365000	San Juan River at Farmington	50	40	21	4	100*	0	1	920*	20
5	09367500	La Plata River near Farmington	110	40	250	5	40	0	2	2,100	20
7	09367561	Shumway Arroyo near Waterflow	2,100	690	480	10	-	0.5	150	2,600	80
9	09367680	Chaco Wash at Chaco Canyon N.M.	80	540	220	-	100	0	1	190	20
11	09367685	Ah-Shi-Sle-Pah Wash near Kimbeto	150	720	22	10	30*	0.5	2	150	60
12	09367710	De-Na-Zin Wash near Bisti T.P.	240	380	8	6	-	0	3	200	40
13	09367930	Hunter Wash at Bisti T.P.	210	1,200	80	10	-	0	6	650	30
16	09367938	Chaco River near Burham	200	430	12	7	200	1.0	3	270	20
17	09368000	San Juan River at Shiprock	130	20	71	5	30	0.5	2	620	40
19	09395500	Puerco River at Gallup	150	13,000	5*	8	-	0	38	-	9

APPENDIX B-8

Table B-8. Estimates of sediment yield from PRLA tracts.

PRLA number	Total surface area disturbed in acres	Erosion rate, in acre-feet per square mile per year	Sediment yield, in acre-feet per year	PRLA number	Total surface area disturbed in acres	Erosion rate, in acre-feet per square mile per year	Sediment yield, in acre-feet per year
NM-585	2,811	1-3	4.4-13.2	NM-6802	340	>3	>1.6
NM-3752	3,760	1-3 (50%) .2-.5 (50%)	3.6-10.3	NM-6803	160	1-3	.25-.75
NM-3753	2,951	1-3 (55%) .2-.5 (45%)	2.9-8.6	NM-6804	1,602	>3 (60%) 1-3 (40%)	5.5-7.5
NM-3754	3,075	.2-.5 (80%) 1-3 (20%)	1.7-4.8	NM-7235	160	.2-.5	.03-.12
NM-3755	2,588	1-3 (10%) >3 (90%)	11.2-12.2	NM-8128	4499	1-3 (90%) .2-.5 (10%)	6.3-19
NM-3834	160	>3	>.75	NM-8129	1520	1-3 (45%) >3 (45%) .2-.5 (10%)	4.3-6.5
NM-3835	4,500	1-3 (25%) .2-.5 (75%)	2.8-7.9	NM-8130	2133	1-3 (80%) .2-.5 (20%)	2.8-8.3
NM-3836	5,110	1-3	8-24	NM-8715	1921	.2-.5 (50%) 1-3 (50%)	1.8-5.2
NM-3837	5,120	1-3 (70%) >3 (30%)	12.8-24.0	NM-8717	600	1-3	.9-2.8
NM-3838	4,787	>3	>22.4	NM-8745	520	1-3	.8-2.4
NM-3918	4,477	1-3 (42%) .2-.5 (42%) >3 (16%)	3.8-13.4	NM-9764	240	1-3	.4-1.1
NM-3919	4,478	1-3	.7-21.	NM-11670	1119	.2-.5 (90%) >3 (10%)	2.1-5.2
NM-6801	160	0-.2	0-.05	NM-11916	160	>3	>.75

Surface acres disturbed are based on preliminary estimates and will be changed to reflect revised estimates.

Erosion rates from Figure 2-5 in the Draft Environmental Assessment for Coal Preference Right Leasing, New Mexico (USDl, BLM 1981a).

APPENDIX B-9

Table B-9. Estimates of sediment yield from coal tracts

Lease area	Total surface area disturbed in acres	Erosion rate, in acre-feet per square mile per year	Sediment yield, in acre-feet per year	Lease area	Total surface area disturbed in acres	Erosion rate, in acre-feet per square mile per year	Sediment yield, in acre-feet per year
La Plata 1	1070	.5-1	.8-1.7	Catalpa Canyon	730	.5-1	.6-1.1
La Plata 3	1128	.5-1	.9-1.8	Sandance	1597	.5-1	1.2-2.5
Johnson Trading Post	5112	.2-.5	1.6-4.0	Hogback	2198	.5-1	1.7-3.4
Star Lake East 1	4130	1-3	6.5-19.4	Twin Buttes	12550	.5-1	9.8-19.6
Star Lake West 2	2165	.2-.5	.7-1.7	Pinehaven	1831	.5-1	1.4-2.9
Kimbeto 2	1135	.2-.5	.4-.9	Bread Springs 1	930	.5-1	.7-1.5
Gallo Wash 1	1906	1-3	3.0-8.9	Gamerco 1 and 2	1942	.5-1	1.5-3.0
Bistl 1	4871	1-3	7.6-22.8	Samson Lake 2/2	973	.5-1	.8-1.5
Bistl 2	4598	1-3	7.2-21.6	La Plata 2 *	160	.5-1	.1-.2
Bistl 4	3740	1-3	5.8-17.5	La Plata 4 *	160	.5-1	.1-.2
Bistl 6/8	560	1-3	.9-2.6	Star Lake East 2	160	1-3	.2-.7
Lee Ranch East	2196	1-3	3.4-10.3	Kimbeto *	160	1-3	.2-.7
Lee Ranch Middle	8572	1-3	13.4-40.2	Nageezi *	160	1-3	.2-.7
Lee Ranch West	10132	1-3	15.8-47.5	Gallo Wash *	-	1-3	-
Divide	4325	1-3	6.8-20.3	Hospah	-	1-3	-
Crownpoint NE	10834	.5-1	8.5-16.9	Tah-ha-bah well *	160	.5-1	.1-.2
Crownpoint East	12979	.5-1	10.1-20.3	Bread Springs 2	80	.5-1	.06-.1
Hospah 1	-	1-3	-	Gamerco *	160	.5-1	.1-.2
Chico Wash South	8572	<.2	<2.7	Samson Lake 1 *	160	.5-1	.1-.2

* Indicates underground mine.

Surface acres disturbed are based on preliminary estimates and will be changed to reflect revised estimates

Erosion rates from Figure 2-5 in the Draft Environmental Assessment for Coal Preference Right Leasing, New Mexico (USDI, BLM 1981a)

APPENDIX B-10

Table B-10. Results of chemical analyses of runoff samples from mine-reclamation plots

All data are provisional and subject to revision. All chemical concentrations are expressed in milligrams per liter. Specific conductance is given in micromhos per centimeter at 25 degrees Celsius.

Location	Date of sample	Calcium, dissolved	Sodium, dissolved	Magnesium, dissolved	Potassium, dissolved	Sulfate, dissolved	Chloride, dissolved	Fluoride, dissolved	Alkalinity (as CaCO ₃)	Sodium adsorption ratio	pH (units)	Specific conductance
San Juan Mine												
1974	07-12-82	40	29	7.1	18	7.0	13	0.3	220	1	6.9	460
reclamation plot	04-23-82	110	1,200	25	13	2,300	54	1.1	120	27	8.0	4,800
	10-02-81	39	47	6.7	22	8.0	15	0.3	200	2	7.1	500
	02-13-79	31	9.8	2.9	17	13	9.8	.1	100	0.5	-	-
1977	04-23-82 (upper stage)	310	800	41	14	2,300	22	.5	90	11	7.0	4,580
reclamation plot	04-23-82 (lower stage)	36	86	3.9	9	160	4.9	.8	120	4	7.4	610
	10-02-81	67	53	7.9	15	33	4.2	.5	270	2	6.9	625
	07-12-81	99	80	12	15	310	4.1	.4	210	2	6.7	965
	11-03-78	41	94	4.4	14	130	5.9	.5	210	4	7.0	640
	09-24-78	53	100	7.8	22	200	7.9	.5	210	3	7.4	940
Navajo Mine												
1973	04-23-82	31	10	4.5	9	17	2.5	.8	72	0.5	7.5	275
reclamation plot	03-05-80	19	11	2.4	8	57	2.1	.2	3	.6	6.8	188
	02-13-79	38	23	6.9	-	-	-	-	38	.9	6.8	410
1976	02-13-79 (upper stage)	13	100	0.9	4	-	-	-	43	7	6.8	590
reclamation plot	02-13-79 (lower stage)	18	210	1.6	6	43	39	.6	120	13	7.1	1,120
1978	02-13-79	150	130	27	12	610	26	.8	74	3	6.0	1,330
reclamation plot	09-24-78	280	440	74	13	1,600	130	1.9	130	6	7.2	3,400
	09-24-78	300	500	92	15	1,900	210	2.4	100	7	7.3	3,600

APPENDIX B-11

DIGITAL MODELING OF GROUND-WATER IMPACTS

Ground-water impacts were analyzed by the Geological Survey (GS), Water Resource Division (WRD) under a formal agreement. Results should be considered as engineering estimates of the effects of ground-water withdrawals on water levels in the major artesian aquifers underlying the coal tracts.

Description of the Model

These impacts were analyzed with the aid of a digital computer. The three dimensional, steady-state model of Frenzel and Lyford (1982) was converted to the transient state, by adding pumping stresses. Grid blocks were six miles on a side. The vertical direction consisted of seven layers ranging in thickness from 300 to 1,500 feet. These layers generally coincided with Jurassic through Cretaceous strata (major aquifers and confining beds) of the San Juan structural basin. The relationship of model layers to geologic units is shown diagrammatically on Figure B-11-1. These relationships are summarized below (in ascending order).

- Layer 1 - Entrada Sandstone (Jurassic). This is a major potential aquifer (300 feet thick).
- Layer 2 - Todilto Limestone, Summerville Formation, Bluff Sandstone, Cow Springs Sandstone, Salt Wash and Recapture Members of Morrison Formation (all Jurassic). This is a confining bed group (500 feet thick).
- Layer 3 - Westwater Canyon Member of Morrison Formation (Jurassic). This is a major aquifer in the San Juan structural basin (300 feet thick).
- Layer 4 - Brushy Basin Member of Morrison Formation (Jurassic), Dakota Sandstone, lower part of Mancos Shale (both upper Cretaceous). This is a confining bed group (500 feet thick).
- Layer 5 - Gallup Sandstone. A major aquifer in the southwest half of the structural basin; and the middle part of the Mancos Shale, a confining bed in the northeast half of the basin (both upper Cretaceous). Layer 5 is 700 feet thick.
- Layer 6 - Middle Mesaverde Group sandstone aquifers to the South (Crevasse Canyon Formation and Dalton Sandstone Member); and the upper Mancos Shale confining bed to the North (all upper Cretaceous). Layer 6 is 1,000 feet thick.
- Layer 7 - Upper Mesaverde Group sandstone aquifers (Point Lookout Sandstone, Menefee Formation, Cliff House Sandstone); and the lower part of the Lewis Shale confining bed (all upper Cretaceous). Layer 7 is 1,500 feet thick.

For greater details regarding the digital model used to analyze ground-water impacts, interested readers are referred to Frenzel and Lyford (1982).

Input to Model

Model input-data consisted of ground-water withdrawal rates in cubic feet per second (CFS), time period of the withdrawals, and aquifer layer. Withdrawals necessarily included those from existing and planned uranium and coal mines, municipalities, major water wells (all those projects identified on BIM's Futures 1 and 2 Baselines), and projected ground-water withdrawals from PRLA and competitive coal lease companies.

Historical pumpage was assumed to have begun in 1941 and continue through 1980; up to 1941 the steady-state conditions of Frenzel and Lyford (1982) were assumed to exist. Much of the historical pumpage data were those used by Woodward Clyde Consultants (1982). Withdrawals from PRLA's were those listed on applications to appropriate ground-water in the San Juan basin (or file at New Mexico State Engineer Office). Competitive coal lease withdrawals were those given in tract analysis engineering reports (Minerals Management Service, 1982). For simplicities sake, competitive coal withdrawals were assumed to be located in the center of each tract. These ground-water withdrawals, pumping periods, locations, and aquifer layers specified for each project simulated are on file at the BIM Rio Puerco Resource Area, in Albuquerque.

The period modeled began in 1941 and ended in 2040. This period was divided into 5-year increments, except for the 1980's, which were divided into a 7-year increment (1981-1987), and a 3-year increment (1988-1990).

Results of Modeling

Results of the ground-water impacts modeling are expressed in terms of drawdown and changes in the mass balance. As a reference base, historical drawdowns (those derived by the model for 1980, after 40 years of pumping) for the Westwater canyon Member of the Morrison Formation and the Gallup Sandstone are shown on Figure B-11-2. For the other aquifer layers, 1980 drawdowns were less than 10 feet.

Impact analysis consisted of modeling historical pumpage impacts from BIM's Futures 1 and 2 Baselines. Each alternative was, in turn, added in sequence to this baseline to derive impacts resulting from increasing levels of development.

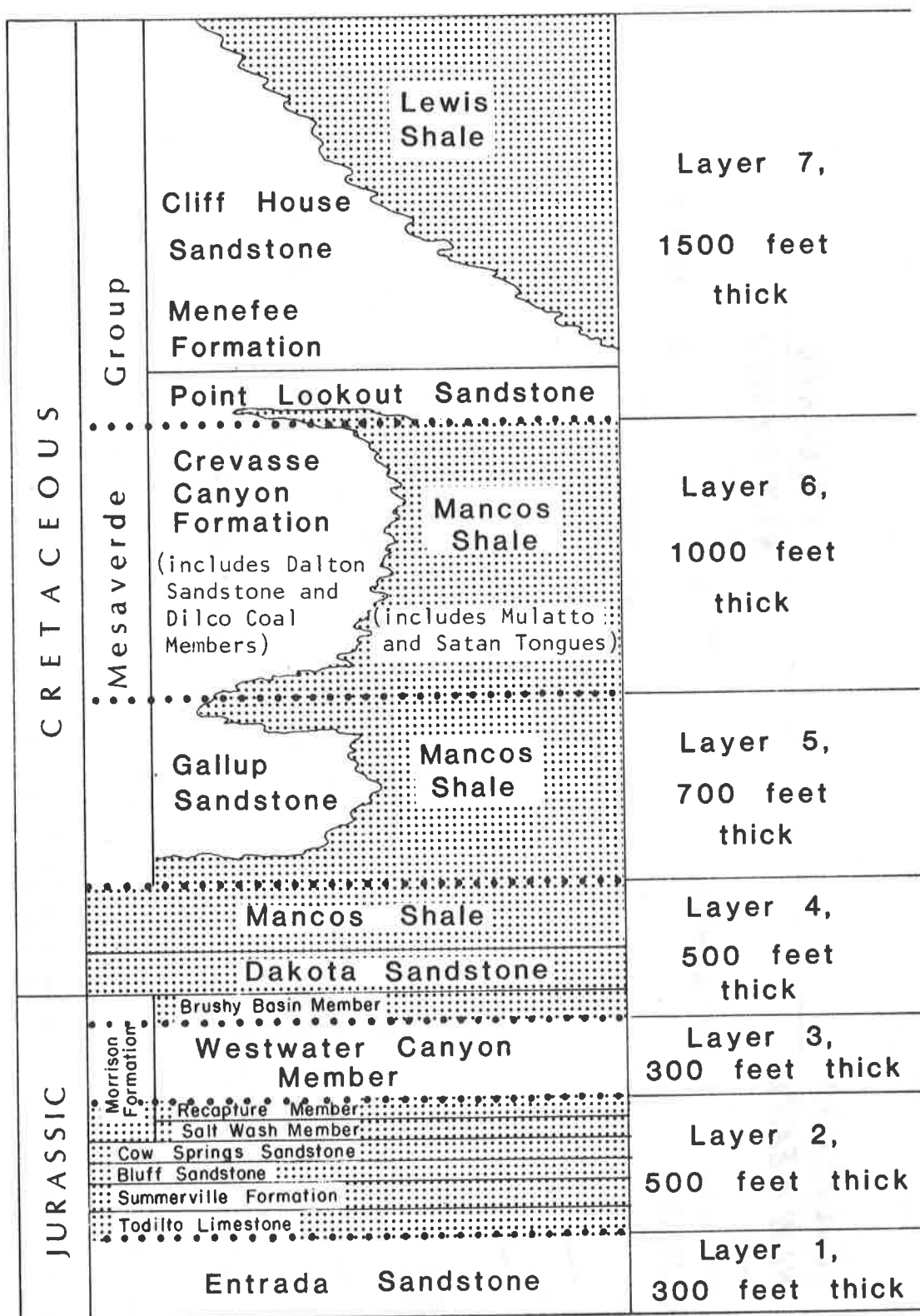
Changes in Mass Balance

In a steady condition no ground-water comes from or goes into storage. A steady-state condition was assumed to exist before 1941. Between 1941 and 1980 most ground-water withdrawn came from storage with minor increases in ground-water inflow and decreases in outflow. This pattern continued through the model simulation of future ground-water withdrawals.

Analysis of mass balance was conducted for the No Action and Target Alternatives. Net ground water flow rates were identical for both these alternatives. In general, the analyses showed that ground-water inflow to the San Juan structural basin would be increased and that natural outflow would be decreased correspondingly.

Outflow (or discharge) to the Rio Grande Valley to the southeast could be decreased by 3 CFS in the year 2000, by 75 CFS in 2020, and by 1.5 CFS in 2040. Outflow to the Lower Colorado River basin to the southwest could be decreased by 7 CFS in 2000, 2.5 CFS in 2020, and 2 CFS in 2040. Outflow to the San Juan River basin could be decreased by 0.75 CFS in 2000, and by 1.5 CFS in 2020 and 2040.

The increase in ground water inflow to the San Juan structural basin could induce flow from the Chuska Sandstone in the west, by lowering the potentiometric surface in the Westwater Canyon aquifer. The Chuska Sandstone is a Tertiary-aged geologic unit which unconformably overlies the Westwater Canyon Member in the Chuska Mountains to the west. These two units are probably hydraulically connected. The induced flow from the Chuska Sandstone could be as great as 1 CFS in the year 2000, 2 CFS in 2020, and 1.5 CFS in 2040. If this occurred the discharge of springs issuing from the Chuska Sandstone could be reduced by an equal quantity.



NOTE: Shaded areas are defined as confining beds in the model.

FIGURE B11-1 Relationship between model layers and geologic units in the San Juan structural basin.

Source: GS, WRD. 1983.

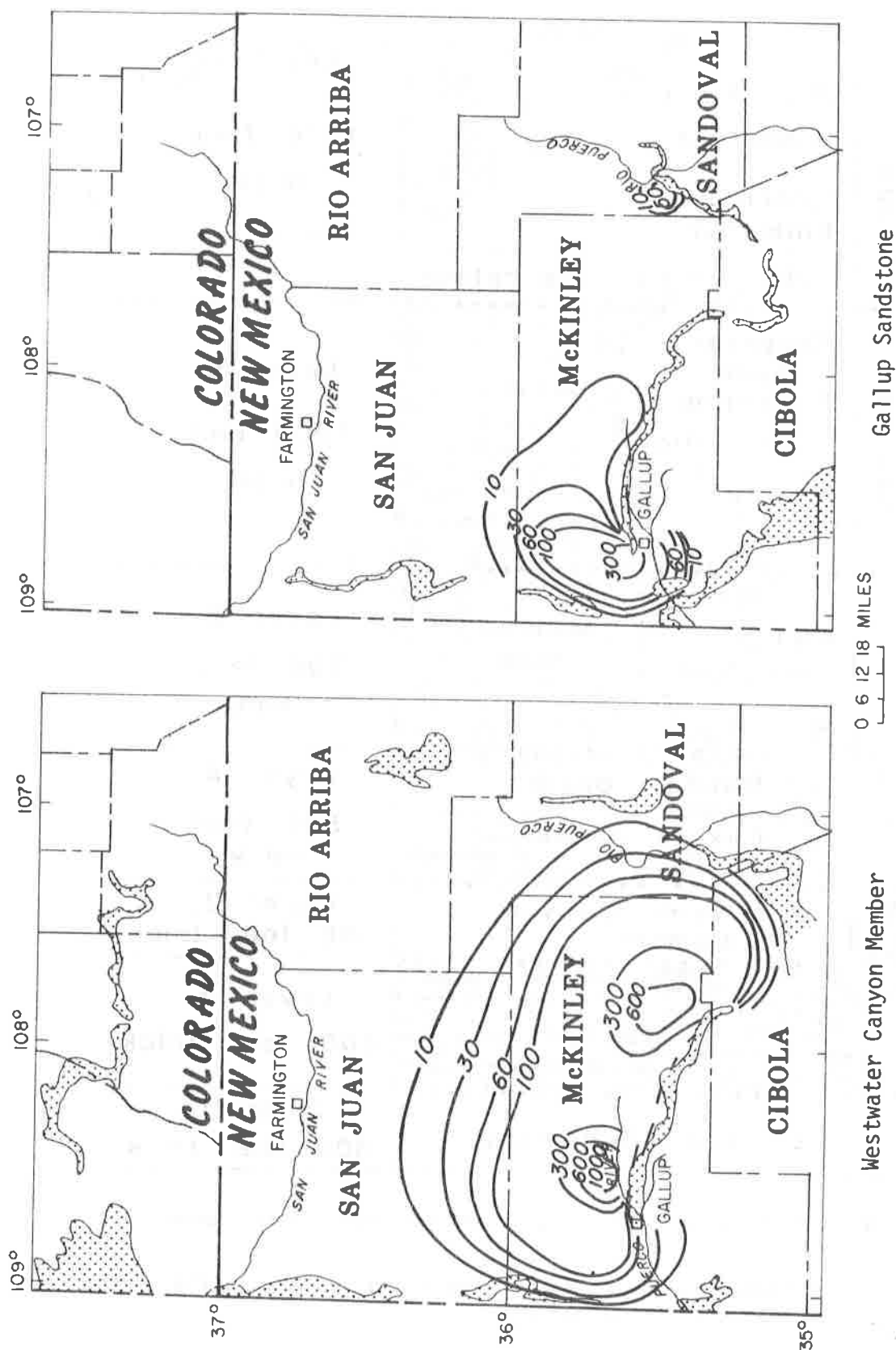


FIGURE B11-2 Model derived drawdowns for the Westwater Canyon Member of the Morrison Formation (Layer 3) and the Gallup Sandstone (Layer 5) for the year 1980.

Source: GS, WRD. 1983.

February 10, 1983

Figures B-11-1 and B-11-2

Figure B-11-1 - Relationship between model layers and geologic units in the San Juan structural basin.

Source: Geological Survey, Water Resources Division, 1982.

Figure B-11-2 - Model-derived drawdowns for the Westwater Canyon Member of the Morrison Formation (Layer 3) and the Gallup Sandstone (Layer 5) for the year 1980.

Source: Geological Survey, Water Resources Division, 1982.

APPENDIX C

VEGETATION

APPENDIX C-1

VEGETATION TYPES

Sagebrush Type: (041)

Big sagebrush is the dominant species. Sagebrush and perennial understory species density varies with soil type and past grazing use. Native vegetation production potential is good.

Grass species commonly present with big sagebrush include blue grama, galleta, bottlebrush squirreltail, western wheatgrass, sand dropseed and Indian ricegrass. Common forbs are wildbuckwheat, Russian thistle, tansymustard and woolly Indian-wheat. Broom snakeweed, fourwing saltbrush, pricklypear cactus, and winterfat are typical shrubs.

Pinyon-Juniper Type

The type is dominated by an overstory of pinyon pine and juniper species. Browse and grass production is greater when the stand is young. As the stand matures, shading increases and limits understory production. Isolated pockets of ponderosa pine, Douglas fir, quaking aspen, and narrowleaf cottonwood are found at heads of many rocky canyons.

Principal shrub species include true mountain-mahogany, antelope bitterbrush, oakbrush species, Mormon-tea, fourwing saltbush, pricklypear cactus, serviceberry and New Mexican cliffrose. Sparse understory cover includes blue grama, galleta, Indian ricegrass, prairie junegrass, sand dropseed, muttongrass and needle-and-thread. Scattered forbs are wildbuckwheat, penstemon species, fleabane, milkvetch species, and Hymenoxys species.

Grassland Type

The grassland type is not uniform throughout, but is dominated by galleta and blue grama. Areas of deep, coarse textured soils commonly support Indian ricegrass, galleta, blue grama, sand dropseed, fourwing saltbush and Mormon-tea. Swales, drainages, and low lying areas where soils are mildly alkali contain galleta, alkali sacaton, bottlebrush squirreltail, and western wheatgrass. Black greasewood, shadscale and fourwing saltbush are major scattered shrubs. Sunflower species annual saltbush species, and Russian thistle are common forbs. Upland soils of greater loam and clay content support a grass complex where galleta, blue grama, alkali sacaton, sand dropseed, and red threeawn dominate. Characteristic shrubs include fourwing saltbush, winterfat, sagebrush species, soapweed, Mormon tea, broom snakeweed, and rabbitbrush species. Woolly Indian-wheat, Russian thistle, wildbuckwheat, globmallow, and dock are common forbs.

Production of native vegetation for livestock use is good. Numerous Navajo family operations, as well as a few larger livestock operators are supported by this type.

Halophytic Type

Black greasewood dominates the aspect on alkaline soils, while fourwing saltbush occupies saline soils. They may be found growing together associated with mound saltbush shadscale, mat saltbrush and big sagebrush. Major grass species are alkali sacaton and other dropseed species galleta, western wheatgrass, bottlebrush squirreltail, and inland saltgrass. Forbs are frequent including Russian thistle, goosefoot species, stickseed pepperweed, fireweed, summercypress, pussytoes, annual saltbush species, dock, and seepweed. Vegetation production potential is limited by soil restrictions.

Fourwing saltbush and black greasewood comprise overstory vegetation. Fourwing saltbush is prevalent on saline soils while black greasewood is most prevalent on alkaline soils.

Common grasses are alkali sacaton, galleta, western wheatgrass, blue grama and inland saltgrass. Frequent forbs are Russian thistle, goosefoot species, stickseed, pussytoes pepperweed, and fireweed summercypress.

Vegetation consists of grasses, scattered shrubs and an abundance of annuals. The site can support a good grass cover when in good range condition and under proper range management. Alkali sacaton, black greasewood, fourwing saltbush, galleta, inland saltgrass, shadscale, and broom snakeweed comprise a major portion of the vegetation.

Potential perennial production is good for native saline and sodic tolerant species, under proper management.

Conifer Type

Overstory consists of mixed pinyon, juniper species and ponderosa pine, with Douglas fir occurring on moist, shaded sites. Pinyon and ponderosa pine are found on more exposed rocky areas. Quaking aspen also occurs in canyon heads. Understory is dominated by grasses such as blue grama, galleta, bottlebrush squirreltail, Arizona fescue, prairie junegrass, muttongrass, mountain muhly, and western wheatgrass. Shrubs/species are not abundant.

Rock Outcrop Type

General aspect is rocky with scattered pinyon pine, juniper species and shrub. Common shrubs include New Mexico cliffrose, antelope bitterbrush, serviceberry, true mountain mahogany, big sagebrush, bud sagebrush, pricklypear cactus, broom snakeweed, fendler bush, rabbitbrush species, and Mormon-tea. Grasses are not common.

Majority of vegetation is located along channel edges. These edges often have a high watertable and support sub-irrigated riparian vegetation. The arroyo or river bed is usually barren. Riparian areas support a diverse complex of vegetation, with common species being cottonwood, saltcedar, Russian-Olive, sedges, rushes, inland saltgrass, western wheatgrass, and numerous forbs.

Duneland Type

It is composed of deep, excessively drained, gently to moderately sloping, shifting, nearly barren sand masses.

Vegetation is sparse. Woody species dominate, with shrubs often covering sand dune tops. Species occurring include black greasewood, fourwing saltbush, giant dropseed, Indian ricegrass, and alkali sacaton. Forb occurrence is limited.

Badlands Type

Vegetation is generally located in flats and intermittent channels which dissect the landform. Vegetation is sparse. Main grasses are alkali sacaton and galleta. Shrubs are black greasewood, shadescale, mound saltbrush, fourwing saltbush, broom snakeweed, rabbitbrush species, and Mormon tea. Principal forbs are Russian thistle, wildbuckwheat, annual saltbush species, four-o'clock, and composite species.

Riverwash-Wetland Type

Streamflow is highly variable, intermittent, and of short duration. These drainages are dry the majority of the year.

APPENDIX D
WILDLIFE

APPENDIX D-1

BIOLOGICAL ASSESSMENT
for
SAN JUAN RIVER REGIONAL COAL EIS

Prepared by
J. David Renwald
Wildlife Management Biologist

United States Department of Interior
Bureau of Land Management
Farmington Resource Area
Farmington, New Mexico

Federal Threatened or Endangered Species
Potentially Occurring Within the San
Juan Regional Coal ES Area
and Determination of Effect

1. Peregrine Falcon (Falco peregrinus) - No effect.
2. Bald Eagle (Haliaeetus leucocephalus) - May effect.
3. Black-footed Ferret (Mustela nigripes) - May effect.
4. Colorado River Squawfish (Ptychocheilus lucius) - No effect.
5. Mesa-verde Cactus (Sclerocactus mesa-verdae) - May effect.

Proposed Species - None

Critical Habitat - None

Basis for Determination of Effect

1. Peregrine Falcon

In the Revised Check-list for the Birds of New Mexico by Hubbard (1978) it states that the peregrine falcon summers in montane areas statewide and breeds on cliffs near water. However, there are no known historical nesting records for the project area (Nelson, personal communication, 1982) though birds are seen during spring and fall migrations. Raptor nesting surveys (opportunistic) conducted for the BLM by Bio-West, Inc., an independent contractor, from July 1980 through September 1981 turned up no evidence of peregrine falcon nesting. Surveys were conducted from ground and helicopter routes in potentially suitable cliff areas. Raptor nest surveys conducted cooperatively by the USFWS and BLM using helicopters (April 6, 7, 1982 and June 2, 1982) also proved negative.

Consultation with the New Mexico Department of Game and Fish (NMDG&F) pertaining to Coal Unsuitability Criteria #10 was conducted during planning stages for the Chaco Unit Resource Analysis in 1980. At that time they stated that there were no habitats on federal lands critical or essential to T&E plants or animals (see attached Enclosure 1). Other sources used for determination of effect were: the U. S. Forest Service Run-Wild Program; New Mexico Heritage Program; A Wildlife Inventory of the Star Lake-Bisti Coal Lease Area by the Office of Biological Services, USFWS; and the most recent issues of American Birds from February, 1976 through March, 1982.

We feel that the general lack of water, adjacent cliff sites and preferred prey items preclude peregrine falcons from nesting or wintering in the project area.

2. Bald Eagle

The discussion concerning the peregrine falcon is applicable here. The same contracted and cooperative nesting surveys proved negative. Consultation with the state (see Enclosure 1) and numerous public meetings conducted by the Regional Coal Team in 1982 also resulted in no important habitat identified by NMDG&F. Winter bald eagle use along the La Plata River is not close enough to the La Plata 1-4 tracts to pose significant impacts (see Map D-1).

Sources and references are the same as for the peregrine falcon with the addition of Wintering Bald Eagle Studies compiled by Grubb (1979).

3. Black-footed Ferret

The potential for finding black-footed ferrets (BFF) does exist in northwest New Mexico (Findlay 1977, USFWS 1980). Recent surveys for BFF have proved negative within and adjacent to the EIS project area. These surveys include: the MAPCO, Inc. linear right-of-way completed in the summer of 1980; Investigations of Potential Black-footed Ferret Habitat in the Vicinity of Crownpoint, New Mexico done by Sverdrup & Parcel and Associates, Inc., ocular reconnaissance of prairie dog towns within the study area inventoried by Bio-West, Inc. a contractor hired by BLM to do wildlife surveys in the Chaco-Bisti area; and numerous surveys done by USFWS prior to prairie dog poisoning programs in northwest New Mexico. A BFF sighting by Berger in 1977, at one time confirmed, is presently considered unconfirmed after recent conversations with Berger.

In order to provide for the welfare of potential BFF's mine plans within the project area will stipulate that any prairie dog towns larger than 50 acres that could be destroyed by mining activities will have a standard BFF survey. This is in keeping with your letter to the State Director, BLM, dated September 8, 1981.

Based on the above information we have determined no impact on BFF's.

4. Colorado River Squawfish

One of the assumptions of the PDEIS is that subsurface water in the vicinity of leased coal tracts would be used in mining operations, therefore we have determined that habitats of the Colorado River Squawfish in the San Juan and Animas Rivers would not be affected.

5. Mesa-verde Cactus

Potential habitat has been identified in the Chaco area for this species, however, no extensive ground surveys have been completed. Stipulations in mine plans would require surveys and mitigation to protect this species. No impact on this cactus is expected.

References

Peregrine Falcon:

Hubbard, J.P. 1978. Revised checklist of the Birds of New Mexico. NMSO Publication No. 6.

Nelson, A. 1982. Resident birder in northwest New Mexico for over 20 years. Regional compiler for American Birds.

New Mexico Dept. of Game and Fish. Letter dated May 9, 1980 concerning lands suitable for coal mining.

Arbib, R.A. Editor, American Birds. Issues from Vol. 30, No. 1 to Vol. 36, No. 2.

U. S. Fish & Wildlife Service, 1977. A Wildlife Inventory of the Star Lake-Bisti Coal Lease Area. 80 pp.

Bio-West, Inc., 1982. Wildlife Resource Inventory of the Chaco Strippable Coal Belt Area, New Mexico. Contract YA-553-CTO-1072 for USDI-BLM, Albuquerque, New Mexico. 241 pp.

Bald Eagle:

Same as above, plus:

Grubb, T. 1979. Wintering Bald Eagle Studies. USFS Rocky Mountain For. and Range Exp. Sta., Tempe, Az.

Black-footed Ferret:

Berger, S. 1977. Memo entitled "Black-footed Ferret Recovery Plan" from State Director, BLM, New Mexico, to Area Manager, USFWS, Pierre, South Dakota, listing sightings for this region.

Berger, S. 1981. Personal conversations with BLM wildlife staff to the effect that sightings should be unconfirmed.

New Mexico Dept. of Game and Fish, 1979. Handbook of Species Endangered in New Mexico.

Sverdrup and Parcel and Associates. 1980. Investigations of Potential Black-footed Ferret Habitat in the Vicinity of Crownpoint, New Mexico. 801 N. Eleventh St., St. Louis, Mo. 63101. Report done for EPA.

Colorado River Squawfish: New Mexico Dept. of Game and Fish. 1979.
Handbook of Species Endangered in New
Mexico.

Mesa-verde Cactus: Knight, D.J. 1981. Rare, Threatened,
Endangered and Other Plants of Concern
in the BLM Chaco-San Juan Planning Area
of Northwestern New Mexico. N. M.
Dept. of Nat. Res., N. M. Heritage
Program, Santa Fe, New Mexico.

BALD EAGLE HABITAT

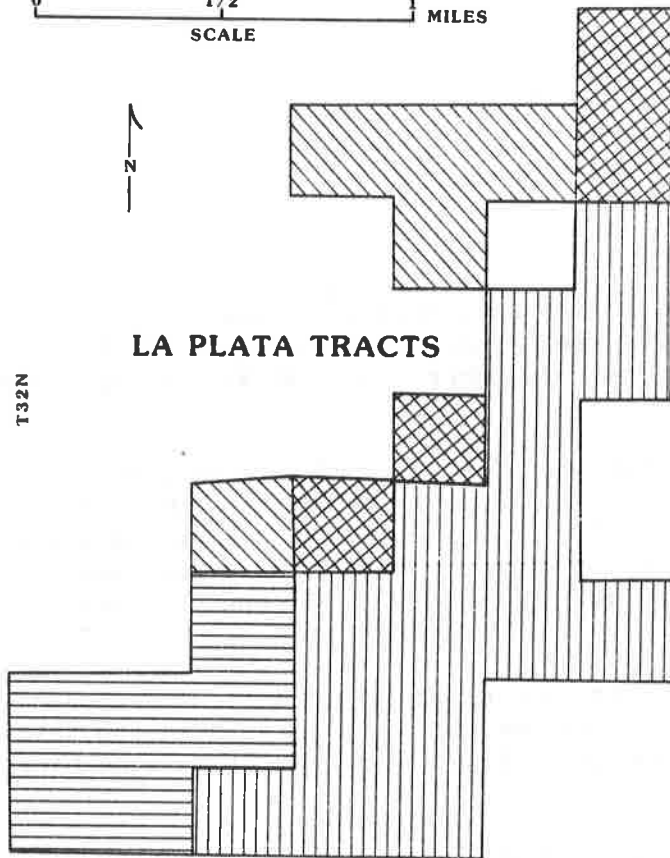
R13W

0 1/2 1 MILES
SCALE



LA PLATA TRACTS

T32N



MAP D-1



LA PLATA #1: SURFACE



LA PLATA #3: SURFACE



LA PLATA #2: UNDERGROUND



LA PLATA #4: UNDERGROUND



BALD EAGLE WINTER USE: HEAVY 1-4 BIRDS-CONSISTENT



BALD EAGLE WINTER USE: LIGHT 0-2 BIRDS-INTERMITTENT



United States Department of the Interior

BUREAU OF LAND MANAGEMENT

P.O. BOX 568
FARMINGTON, NEW MEXICO 87401

IN REPLY REFER TO

6800
3400

December 20, 1982

Mr. Richard A. Hoppe
Field Supervisor, FWS
Ecological Services
P.O. Box 4487
Albuquerque. NM 87196

Dear Mr. Hoppe:

We appreciated being able to meet with Joel Medlin and Gary Halverson on December 7 concerning the consultation process. As a result of that meeting and your recent letter dated December 13 we are requesting formal Section 7 consultation.

We do agree with the reasoning for your "may affect" determination for the bald eagle, black-footed ferret and Mesa Verde cactus. Our own belief that there was a "no affect" on these species was based on various BLM policies requiring surveys and mitigation as well as other laws and regulations specific to coal mining which provides for the protection of T&E species.

The only item in your recent letter concerning our biological assessment that we would dispute would be the estimate of 30 eagles using the three river systems. This number seems quite high to us, but it is something we can address later.

Again, we look forward to working together.

Sincerely,

Forrest Littrell
Area Manager



**UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE**

Field Supervisor
Ecological Services, USFWS
Post Office Box 4487
Albuquerque, New Mexico 87196

Cons. #2-22-83-F-013
(2-2-82-I-214)

March 17, 1983

Memorandum

To: Area Manager, Bureau of Land Management,
Farmington Resource Area, Farmington, New Mexico

From: Field Supervisor, FWS, Ecological Services,
Albuquerque, New Mexico

Subject: Section 7 Consultation, Biological Opinion,
Regional Coal Leasing San Juan and McKinley
Counties, New Mexico (BLM)

This is in response to your December 20, 1982 request for formal Section 7 consultation as provided by the Endangered Species Act, regarding your Agency's proposed decision to offer for lease 129 million to 1.9 billion tons of coal in northwestern, New Mexico.

On May 19, 1982 your office requested a species list; which was provided June 3, 1982. On June 23, 1982 you provided a biological assessment. The Fish and Wildlife Service (FWS) commented on the biological assessment on August 11, 1982. On August 25, 1982 a second biological assessment was received from BLM. On December 9, 1982 a meeting was held in Farmington to discuss the biological assessment and compliance regulations. Another comment was provided BLM on the biological assessment on December 13, 1982. On December 23, 1982 we received your request for formal consultation. On January 18, 1983 we acknowledged your request for formal consultation and requested further clarification on your proposed action and stipulations to be included in leases to insure endangered species compliance. Your January 31, 1983 memorandum further clarified BLM's proposed action and intentions to make lease stipulations for Endangered Species Act compliance.

The following background information and biological opinion are founded upon information furnished by BLM, Bureau of Indian Affairs (BIA), data in our files and discussions with persons familiar with endangered species and proposed coal leasing.

The decision to proceed with the San Juan Regional Coal Leasing will culminate in a lease sale in December 1983. Leasing will result in an undetermined number of mines that may be developed in proximity to the bald eagle (Haliaeetus leucocephalus) black-footed ferret (Mustela nigripes) and Mesa Verde cactus (Sclerocactus mesae-verde).

BACKGROUND INFORMATION

The proposed Federal Action under consultation is BLM's decision to offer 129 million to 1.94 billion tons of coal for competitive lease and to issue leases for all or a portion of the 26 Preference Rights Lease Applications (PRLA's). The potential coal lease tracts and PRLA's are located in San Juan and McKinley counties in northwestern, New Mexico.

The end result of the lease sale will be awarding of leases and mining of surface and underground coal mines in the San Juan Coal Region. Additional reviews and decisions to issue mine permits under authority of the Surface Mining and Reclamation Control Act will be required on a case by case basis for individual mines. These reviews and permits will be under the purview of the Office of Surface Mining (OSM), and the surface land management agencies (BLM or BIA). Thus there will be additional opportunity to comply with Section 7 of the Endangered Species Act during review and issuance of individual mine permits.

The proposed action involves five different alternatives: 1) the No Action Alternative includes issuance of all or a portion of the 29 PRLA's, with the potential to disturb 31,910 surface areas; 2) the By-pass Alternative includes 8 coal tracts; 3) the Minimum Surface Owner Conflict Alternative includes 11 tracts; 4) the Target Alternative proposes 24 tracts; and 5) the High Alternative offers for competitive lease a total of 39 tracts, with the potential to disturb 68,641 surface acres. For the purpose of this consultation we have considered the above alternatives and potential effects as displayed by BLM's San Juan Regional Coal Environmental Impact Statement dated November, 1982, and the Environmental Assessment for Coal Preference Right Leasing, New Mexico, dated September, 1981 (PRLA EA). Our biological opinion is formulated on the High Alternative thus insuring that all potential impacts are considered, including the potential to issue all competitive leases as well as the PRLA's.

On March 16, 1978 the bald eagle was listed as endangered in the conterminous United States except for several northwest and Great Lakes States where it was designated as threatened (43 FR 6233). Reasons for decline of this species include habitat loss, pesticide-induced reproductive failure and human disturbance. The bald eagle utilizes aquatic habitats in the San Juan Basin during the winter period, November through February. Significant winter use occurs mainly at Navajo Reservoir and on the Animas River. Other aquatic habitats such as the San Juan and La Plata Rivers, adjacent wetlands and open water areas are also used for foraging, resting and roosting.

The following potential impacts to bald eagles and their winter use areas which could result from coal leasing were considered: 1) loss of habitat to mining; 2) direct diversion of water from Navajo Reservoir or the San Juan River; 3) loss of riverine and wetland habitats due to increased demand for social and economic development projects such as housing, flood control, water supply and transportation; and 4) human disturbance associated with increased population.

Bald eagle use in coal tracts or PRLA areas proposed for leasing has not been documented. Bald eagles utilize aquatic habitat generally not found in lease areas. It is possible for an occasional eagle to forage in or near lease or PRLA areas. Even though about 110,000 acres is potentially planned for leasing, only a portion of that area would be initially mined. The normal strip mining process involves mining a portion of the tract with subsequent reclamation of mined areas as new mining proceeds. Thus, it is unlikely that bald eagles would be directly affected by the strip mining.

BLM's draft Coal Leasing EIS and PRLA EA indicates over 12,000 acre-feet of water per year will be required for mining and reclamation. The source of this water is unknown at this time, and plans for obtaining water will be formulated by industry during mine plan development. Surface waters in the San Juan Regional Coal area are fully appropriated at this time. The PRLA EA indicates some mining companies plan to use ground water and intermittent surface waters available in or near coal tracts for mining and reclamation; thus, significant habitat impacts at Navajo Reservoir and the San Juan River are not likely, and it is unlikely that bald eagles would be affected by diversion of water.

Coal leasing will result in increased demands for housing, water supply, transportation, flood control and other social or economic development projects (Chapter 3, BLM's Draft Coal Leasing EIS). Potential for impacts to bald eagle winter use areas on the San Juan River, La Plata River, and lower portions of the Animas River near the cities of Bloomfield, Farmington, Shiprock and Aztec were considered. These riverine and adjacent wetland areas presently do not receive significant eagle use; thus impacts to eagles are not likely to occur. Major economic development projects will likely be evaluated individually for effects on endangered species; and compliance with the clean Water Act, and Wetland and Floodplain Executive Orders which mandate aquatic habitat protection.

Aquatic related recreation demand in the San Juan Region is expected to increase about 18 percent by the year 2019 (Chapter 3, pages 3-16 thru 25, BLM's Draft San Juan Basin Cumulative Overview, November 1982). Increased recreation use is expected at Navajo Reservoir and along the San Juan, Animas and La Plata Rivers where there is public access. Human disturbance will likely affect bald eagle winter use by displacing eagles. However, most of the present and projected recreation use is expected to occur during summer months when eagles are not present in large numbers. Eagle use of the Animas River occurs mostly above the City of Aztec where there is less public access. Access for hunting on the Animas, La Plata and San Juan Rivers is limited. Illegal shooting or other law enforcement problems associated with bald eagles has not been a problem in the area. In addition, BLM is initiating planning for road closures to reduce public access to bald eagle winter use areas.

In summary, direct and indirect habitat losses are not expected to affect bald eagle winter use areas. Increased recreation has a potential to affect wintering bald eagle use at Navajo Reservoir and in riverine habitats. These effects are not expected to be significant, because most recreation will occur in non-winter periods, public access

to riverine areas is limited, and public access restrictions are being planned.

The black-footed ferret was listed as endangered on March 11, 1967 (32 FR 4001). Reasons for its decline include habitat loss and prairie dog control programs. While no recent, verified sightings of black-footed ferrets have been made in New Mexico, there is potential that the ferret may exist in northwestern, New Mexico. Recent discoveries of black-footed ferrets in Wyoming during fall of 1981 and throughout 1982 give added impetus to requiring surveys for ferrets. Potential habitat for ferrets in New Mexico is considered to be prairie dog towns.

BLM data indicates that 29 prairie dog towns occur in the immediate area of potential coal developments. To date, only two of these towns have been surveyed for black-footed ferrets. Surveys for ferrets should be conducted prior to surface disturbance. BLM has indicated that surveys will be required as lease stipulations.

The Mesa Verde cactus was listed as threatened on November 29, 1979 (44 FR 61471). Reasons for listing this species as threatened include limited distribution, collection by cactus collectors, habitat destruction and potential threats resulting from energy development activities. The primary distribution of Mesa Verde cactus is in north central San Juan County, New Mexico. Another small population is located near Sheep Springs, in southwestern San Juan County. Potential habitat includes dry exposed hillsides of Mancos or Fruitland clays between 4,800 and 5,500 feet in elevation. These habitats may occur in the potential coal lease and PRLA areas. No surveys for Mesa Verde cactus have been conducted to date in these areas. BLM has indicated lease stipulations will require surveys to determine occurrence of the cactus in mine areas.

BIOLOGICAL OPINION

Based on this evaluation, it is my biological opinion that the proposal to offer for lease 129 million to 1.9 billion tons of coal in northwestern New Mexico is not likely to jeopardize the continued existence of the bald eagle, black-footed ferret and Mesa Verde cactus.

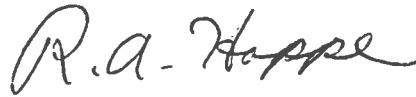
Because there is potential for occurrence of the black-footed ferret and the Mesa Verde cactus in the proposed lease and PRLA areas and leasing could affect these species if they were found to be present, we endorse BLM's plans to require appropriate surveys as stipulations on leases. If these surveys reveal the occurrence of the black-footed ferret or the Mesa Verde cactus in any lease area, appropriate consultation should be initiated by OSM, BLM or BIA during permit planning stages of mine development.

D Concluded

5

Further consultation is not required unless new information becomes available that discusses the bald eagle, black-footed ferret or Mesa Verde cactus. If new species are listed that may be affected by this action or the proposed action is modified in a manner not considered in this biological opinion further consultation should be initiated.

Your consideration of threatened and endangered species is appreciated. Please contact this office if you have any questions about this biological opinion.

A handwritten signature in cursive script, reading "R.A. Hoppe".

Richard A. Hoppe

cc:

Director, New Mexico Department of Game and Fish, Santa Fe, New Mexico
Director, FWS, Office of Endangered Species, Washington, D.C.
Regional Director, FWS, AEW, SE, Albuquerque, New Mexico

APPENDIX E

TRANSPORTATION AND LAND USES

APPENDIX E-1

RIGHTS-OF-WAY LOCATED ON PRLAs

PRLA Number	Right-of-Way Type	Right-of-Way Serial Number	Dimension (Feet)	Acreage
NM 585	Natural Gas Pipeline (Application)	NM 18724	50 x 9,000	10.33
	Powerline	NM 23125	20 x 7,000	3.21
	Powerline	NM 26950	20 x 4,000	1.84
	Powerline	NM 29865	20 x 10,300	4.73
	Natural Gas Pipeline	NM 042741	50 x 6,900	7.92
	Telephone Line and Pipeline	NM 066400	70 x 8,400	13.50
NM 3752	Proposed Star Lake Railroad - Atchison-Topeka and Santa Fe Railroad Co. ^{a/}	NM 29324	150-200 x 3,516.36	15.41
NM 3753	N/A			
NM 3754	Powerline	NM 12221	20 x 1,800	.83
	Proposed Star Lake Railroad - Atchison-Topeka and Santa Fe Railroad Co. ^{a/}	NM 29324	150-200 x 6,331.59	23.25
NM 3755	Powerline	NM 0556114	50 x 5,500	6.31
NM 3834	N/A			
NM 3835	N/A			
NM 3836	N/A			
NM 3837	N/A			
NM 3838	N/A			
NM 3918	Powerline	NM 0556114	60 x 15,300	21.07
NM 3919	Powerline	NM 0556114	60 x 3,900	5.37
NM 6801	Natural Gas Pipeline	NM 022491	50 x 6,000	6.89
	Natural Gas Pipeline	NM 022522	50 x 6,000	6.89
	Natural Gas Pipeline	NM 33177	50 x 6,000	6.89
NM 6802	Powerline (Application)	NM 34119	50 x 2,600	2.98
NM 6804	Powerline	NM 0556114	60 x 8,300	11.43
NM 7235	N/A			
NM 8128	Road Right-of-way	NM 30254	35 x 3,300	2.65
NM 8129	N/A			
NM 8130	Natural Gas Pipeline	NM 09148	50 x 2,900	3.33
NM 8715	Natural Gas Pipeline	NM 042741	50 x 2,500	2.87
	Powerline	NM 0559354	150 x 9,600	33.06
	Natural Gas Pipeline & Telephone Line	NM 066400	70 x 2,800	4.50
NM 8717	N/A			
NM 8745	N/A			
NM 9764	N/A			
NM 11670	Natural Gas Pipeline, Powerline, & Road	NM 34781	80 x 4,000	7.35
NM 11916	N/A			

Note: ^{a/}Proposed Facility - pending private land easement acquisition. Federal right-of-way grant issued 12-05-79.

APPENDIX E-2

RIGHTS-OF-WAY LOCATED ON COMPETITIVE COAL LEASE TRACTS

Tract Name	Right-of-Way Type	Right-of-Way Serial Number	Dimension (Feet)	Acreage
La Plata #1 Bypass	Natural Gas Pipeline	NM 26540	50 x 1,000	1.15
La Plata #2 <u>a/</u>	N/A			
La Plata #3	N/A			
La Plata #4	N/A			
Johnson Trading Post	Natural Gas Pipeline (Mapco)	NM 36230	50 x 900	1.03
	Natural Gas Pipeline	NM 16556	50 x 900	1.03
	Natural Gas Pipeline	NM 17176	50 x 13,600	15.61
	Natural Gas Pipeline (Appln.)	NM 18724	50 x 13,500	15.60
	Powerline	NM 8601	20 x 3,900	1.79
	Powerline	NM 26729	20 x 8,400	3.86
	Powerline	NM 27146	20 x 1,600	.73
	Powerline	NM 3742	150 x 1,400	4.82
	Road	NM 30233	25 x 1,200	.69
Star Lake East #1	Powerline	NM 3742	150 x 8,200	28.24
Star Lake East (LC) <u>a/</u>	Powerline	NM 3742	150 x 6,500	22.38
	Powerline	NM 29865	20 x 2,700	1.24
Star Lake West #2 Bypass	Natural Gas Pipeline	NM 042741	50 x 4,500	5.17
	Natural Gas P/L and Telephone Line	SF 066400	70 x 4,500	7.23
Kimbeto #1 <u>a/</u>	Powerline	NM 0556114	60 x 3,300	4.55
Kimbeto #2 Bypass	N/A			
Nageezi <u>a/</u>	Natural Gas Pipeline	—————	50 x 8,500	9.76
Gallo Wash #1 Bypass	Natural Gas Pipeline	NM 09148	50 x 1,100	1.26
Gallo Wash #2 <u>a/</u>	Natural Gas Pipeline (Proposed Shell CO ₂ Line)	NM 29081	40 x 1,200	1.10
	Natural Gas Pipeline	NM 042739	50 x 3,100	3.56
	Natural Gas Pipeline	NM 0558168	50 x 3,100	3.56
	Natural Gas P/L and Telephone Line	SF 066400	70 x 3,100	4.98
	Natural Gas P/L and Powerline, & Road	NM 34781	80 x 1,200	2.20
	Powerline	NM 0559354	40 x 4,600	4.22
	Powerline	NM 27270	20 x 3,200	1.47
	Powerline (Appln.)	NM 34119	50 x 14,500	16.64
Bisti #1	Natural Gas Pipeline	NM 022491	50 x 6,000	6.89
	Natural Gas Pipeline	NM 022522	50 x 6,000	6.89
	Natural Gas Pipeline	NM 33177	50 x 6,000	6.89
	Powerline	NM 12221	20 x 500	0.23
	Powerline	NM 23125	20 x 2,000	0.92
Bisti #2				
Bisti #4 A & B	N/A			
Bisti #6 Bypass	Powerline	NM 12221	20 x 1,300	0.60
Lee Ranch East	Powerline	NM 0263365	100 x 5,800	13.32
Lee Ranch Middle	Powerline	NM 063642	100 x 5,800	13.32

APPENDIX E-2 (Concluded)

Tract Name	Right-of-Way Type	Right-of-Way Serial Number	Dimension (Feet)	Acreage
Lee Ranch West	Powerline <u>a/</u>	NM 063642	100 x 5,900	13.54
	Powerline <u>a/</u>	NM 0263365	100 x 12,600	28.93
Divide	Proposed Star Lake Railroad: Atchison- Topeka and Santa Fe Railroad Co. <u>b/</u>	NM 29324	225 x 1,022	5.28
	Powerline (230 KV) <u>c/</u>	_____	100 x 3,900	8.95
	Four Corners-Ambrosia-Pajarito Powerline (500 KV R/W Issued) <u>a/</u>	NM 41002	200 x 3,900	17.91
	Continental Divide Natural Gas Pipeline System-Proposed By Transwestern Pipeline Corp. <u>d/</u>	NM 53144	40 x 3,000	2.75
Crownpoint Northeast	Powerline <u>a/</u>	NM 40364	30 x 22,400	15.43
Crownpoint East	Powerline (230 KV) <u>c/</u>	_____	100 x 20,800	47.75
	Four Corners-Ambrosia-Pajarito Powerline (500 KV R/W Issued) <u>a/</u>	NM 41002	200 x 20,800	95.50
Hospah #1 Bypass	Proposed Continental Divide Pipeline System-Transwestern Pipeline Corp. <u>d/</u>	NM 53144	40 x 9,200	8.45
Hospah #2 <u>e/</u>	Proposed Star Lake Railroad: Atchison, Topeka and Santa Fe Railroad Co. <u>b/</u>	NM 29324	200 x 5,839.68	26.81
Catalpa Canyon	N/A			
Sundance	N/A			
Tah-Ha-Bah Well (LC) <u>e/</u>	N/A			
Hogback	N/A			
Twin Buttes (LC)	Roadway Materials Site - New Mexico State Highway Commission	NM 037898	_____	1.06
Pinehaven (LC)	Powerline <u>c/</u>	NM 061426	100 x 7,900	18.14
Bread Springs #1 (LC) <u>e/</u>	N/A			
Bread Springs #2 (LC) <u>e/</u>	N/A			
Gamerco #1 Bypass	Powerline <u>c/</u>	_____	50 x 2,600	2.98
Gamerco #1 (LC)	Proposed Con Paso Railroad Route Estimated) <u>f/</u>	_____	200 x 1,500	6.89
Gamerco #2 (LC)	Proposed Con Paso Railroad (Route Estimated) <u>f/</u>	_____	200 x 7,700	35.35
	Natural Gas Pipeline <u>c/</u>	_____	50 x 10,700	12.28
	Powerline (115 KV) <u>c/</u>	_____	50 x 7,200	8.26
Samson Lake #1 (LC)	Powerline (115 KV) <u>c/</u>	_____	50 x 13,500	15.50
	Powerline (115 KV) <u>c/</u>	_____	50 x 17,000	19.51
Samson Lake #2	Powerline (115 KV) <u>c/</u>	_____	50 x 11,500	13.20
	powerline (115 KV) <u>c/</u>	_____	50 x 9,400	10.79

Notes: a/Existing facilities - R-O-W issued - mixed surface ownership (BLM, State, Private, Indian)
b/Proposed facilities - R-O-W issued.
c/Existing facilities - No BLM administered surface is involved
d/Proposed facilities - R-O-W application.
e/Tracts identification for underground mining. Possible exemption from unsuitability criterion (43 CFR 3461.2). Mine plan is necessary for site specific assessment.
f/Proposed facilities _ application status unknown because no BLM-administered surface is involved.

APPENDIX E-3

LAND USE PROPOSALS ON PRLA'S AND COMPETITIVE COAL LEASE TRACTS

PRLA No./ Tract Name	Legal Description	Acreage	Lands Action
NM 3752	T. 23 N., R. 12 W., (NMPM) Sec. 19: Lots 5-20 (all)	650	Ute Mountain Exchange Withdrawal <u>a/</u>
NM 3754	T. 23 N., R. 12 W., (NMPM) Sec. 30: Lots 1-4, E1/2NW1/2	640	Ute Mountain Exchange Withdrawal <u>a/</u>
NM 6803	T. 23 N., R. 11 W., (NMPM) Sec. 14: E1/2NE1/4	80	PLO 5721 - Navajo Exchange Withdrawal <u>b/</u>
Kimbeto #2	T. 23 N., R. 10 W., (NMPM) Sec. 13: NE1/4	160	PLO 5721 - Navajo Exchange Withdrawal <u>c/</u>
Nageezi	T. 23 N., R. 10 W., (NMPM) Sec. 6: Lots 3, 4, 5, SE1/4NW1/4	478	PLO 5721 - Navajo Exchange Withdrawal Sec. 6 <u>b/</u>
Nageezi	Sec. 8: S1/2 T. 24 N., R. 10 W., (NMPM) Sec. 21: S1/2SW1/4 Sec. 30: SE1/4 Sec. 33: SE1/4	400	Sec. 8 <u>c/</u> PLO 5721 - Navajo Exchange Withdrawal <u>d/</u>
Twin Buttes	T. 14 N., R. 19 W., (NMPM) Sec. 26: NW1/4 Entire Tract.	160	PLO 5721 - Navajo Exchange Withdrawal <u>c/</u>
Bisti #1	T. 23 N., R. 13 W., (NMPM) Sec. 15: N1/2NW1/4	3,713	Public Law 96-475 - Bisti Coal Lease Exchange <u>a/</u>
Bisti #6	T. 24 N., R. 11 W., (NMPM) Sec. 34: N1/2	80	Ute Mountain Exchange Withdrawal <u>a/</u>
Nageezi		320	Ute Mountain Exchange Withdrawal <u>a/</u>

Note: a/ Proposed for Exchange.
b/ Not included in Exchange Legislation.
c/ Scheduled for Exchange - Mining Claims are located on these lands.
d/ Included in Exchange Legislation.

APPENDIX E-4

TRANSPORTATION FACILITIES LOCATED ON FEDERAL COAL LANDS (PRLAs)

PRLA Number	Transportation Type And Agency or Company	Serial Number/ Road Number	Dimension (Feet)	Acreage
NM 585	Public Road: Bureau of Indian Affairs	47-A	20 x 9,200	4.22
NM 3752	Star Lake Railroad - Atchison-Topeka and Santa Fe Railroad Co. ^{a/}	NM 29324	150-200 x 3,516.36	15.41
	Public Road: San Juan County	C-15	60 x 7,300	10.06
NM 3753	Public Road: San Juan County	C-15	60 x 8,900	12.26
NM 3754	Star Lake Railroad - Atchison-Topeka and Santa Fe Railroad Co. ^{a/}	NM 29324	150-200 x 6,331.59	23.25
	Public Road: State of New Mexico	371	60 x 1,900	2.62
	Public Road: San Juan County	C-14	60 x 200	.28
NM 3755	Public Road: San Juan County ^{b/}	A-01	60 x 2,700	3.72
NM 3834	N/A			
NM 3835	Public Road: San Juan County	C-15	60 x 6,000	8.26
NM 3836	Public Road: San Juan County	C-14	60 x 7,600	10.47
NM 3837	Public Road: San Juan County	C-14	60 x 14,900	20.52
NM 3838	N/A			
NM 3918	Public Road: State of New Mexico	56/57	60 x 14,300	19.70
	Public Road: San Juan County	A-09	60 x 8,600	11.85
	Public Road: San Juan County ^{b/}	A-10	60 x 8,500	11.71
NM 3919	Public Road: State of New Mexico	56/57	60 x 3,500	4.82
NM 6801	Public Road: State of New Mexico	371	60 x 5,200	7.16
NM 6802	N/A			
NM 6803	Public Road: San Juan County	C-14	60 x 8,400	11.57
NM 6804	Public Road: State of New Mexico	56/57	60 x 9,500	13.09
	Public Road: San Juan County	A-30	60 x 1,400	1.93
	Public Road: San Juan County ^{b/}	A-27	60 x 200	.28
	Public Road: San Juan County ^{b/}	A-28	60 x 4,000	5.51
NM 7235	N/A			
NM 8128	Public Road: San Juan County ^{b/}	A-16	60 x 9,700	13.36
NM 8129	N/A			
NM 8130	Public Road: Bureau of Indian Affairs	46	20 x 4,900	2.25
NM 8715	N/A			
NM 8717	N/A			
NM 8745	N/A			
NM 9764	N/A			
NM 11670	N/A			
NM 11916	N/A			

Notes: ^{a/}Proposed facility - pending private land easement acquisition. Federal right-of-way grant issued 12/05/79.
^{b/}Roads maintained by San Juan County, but not considered county roads.

APPENDIX E-5

TRANSPORTATION FACILITIES LOCATED ON COMPETITIVE COAL LEASE TRACTS

Tract Name	Transportation Type and Agency or Company	Serial Number/ Road Number	Dimension (Feet)	Acreage
La Plata #1 Bypass	N/A			
La Plata #2a/	N/A			
La Plata #3	N/A			
La Plata #4	N/A			
Johnson Trading Post	N/A			
Star Lake East #1	Public Road: BIA	47	20 x 2,200	1.01
	Public road: BIA	47-A	20 x 7,200	3.31
Star Lake East (LC)a/	Public Road: BIA	47	20 x 7,000	3.21
	Public Road: BIA	47-A	20 x 3,300	1.52
Star Lake West #2 Bypass	N/A			
Kimbeto #1a/	Public Road: San Juan County	A-27	60 x 13,500	18.60
	Public Road: San Juan County	A-30	60 x 5,000	6.89
Kimbeto #2 Bypass	N/A			
Nageezia/	Public Road: San Juan County	C-14	60 x 2,600	3.58
Gallo Wash #1 Bypass	N/A			
Gallo Wash #2a/	Public Road: San Juan County	A-15	60 x 3,100	4.27
Bisti #1	Public Road: San Juan County	C-15	60 x 9,000	12.40
Bisti #2	Public Road: State of New Mexico	371	60 x 3,500	4.82
Bisti #4 A & B	N/A			
Bisti #6 Bypass	Public Road: State of New Mexico	371	60 x 3,200	4.41
Lee Ranch East	Public Road: McKinley County	19	60 x 1,100	1.52
Lee Ranch Middle	N/A			
Lee Ranch West	N/A			
Divide	Star Lake Railroad: Atchison-Topeka and Santa Fe Railroad Co.a/	NM 29324	225 x 1,022	5.28
	Public Road: BIA	48-C	20 x 1,300	0.60

APPENDIX E-5 (Concluded)

Tract Name	Transportation Type and Agency or Company	Serial Number/ Road Number	Dimension (Foot)	Acreage
Crownpoint Northeast	Public Road: State of New Mexico	56/57	60 x 17,500	24.10
	Public Road: State of New Mexico	371	60 x 11,900	16.39
Crownpoint East	Public Road: BIA	48-A	20 x 13,000	5.97
Hospah #1 Bypass	N/A			
Hospah #2 ^{a/}	Star Lake Railroad: Atchison- Topeka and Santa Fe Railroad Co. ^{b/}	NM 29324	200 x 5,839.68	26.81
Chico Wash South (LC)	Public Road: McKinley County	C-19	60 x 21,400	29.48
Catalpa Canyon	N/A			
Sundance	N/A			
Tah-Ha-Bah Well (LC) ^{a/}	N/A			
Hogback	N/A			
Twin Buttes (LC)	Public Road: McKinley County	2	60 x 3,000	4.13
	Public Road: McKinley County	26	60 x 15,000	20.66
Pinehaven (LC)	Public Road: State of New Mexico	32	60 x 5,300	7.30
	Public Road: McKinley County	24	60 x 400'	0.55
Bread Springs #1 (LC) ^{a/}	N/A			
Bread Springs #2 (LC) ^{a/}	N/A			
Gamerco #1 Bypass	N/A			
Gamerco #1 (LC)	Proposed Con Paso Railroad (Route Estimated) ^{c/}	—————	200 x 1,500	6.89
Gamerco #2 (LC)	Proposed Con Paso Railroad (Route Estimated) ^{c/}	—————	200 x 7,700	35.35
Samson Lake #1 (LC) ^{a/}	Public Road: McKinley County	1a	60 x 11,500	15.84
	Public Road: McKinley County	1d	60 x 12,200	16.80
Samson Lake #2	Public Road: McKinley County	1a	60 x 2,000	2.75
	Public Road: McKinley County	1d	60 x 2,500	3.44

Notes: ^{a/}Tracts identified for underground mining. Possible exemption from unsuitability criterion (43 CFR 3461.2). Mine plan is necessary for site-specific assessment.
^{b/}Proposed facility - pending private land easement acquisition. Federal right-of-way grant issued 12/05/79.
^{c/}Proposed facility - application status unknown because no BLM-administered surface is involved.

APPENDIX F
AMERICAN INDIAN CONCERNS

APPENDIX F - 1
NAVAJO OCCUPANCIES ON THE PRLAS

Lease Application No.	Legal Description	Surface Ownership	Residence Group	Head of Household	Livestock Permit	No. & Type of Residence	IMPROVEMENTS Associated Structures	Other
SURFACE MINEABLE PRLAS								
NM-585	T. 19 N., R. 5 W.							
	Sec. 3: S½	Public Domain	Group A	A1: Rita Mace A2: Thomas Mace		1 frame house 1 frame house	Corrals, Shed	Water line, fenced garden
	Sec. 6: SW¼	Homestead	Group B	B1: Isabelle Salzar, Manuel Salzar	BIA-Tribe	2 frame houses	Fences, barn, corrals, shed	
				B2: Sam & Barbara Peshlakai	BIA-Tribe	1 trailer house	Church, Shelter	
	Sec. 9: NE¼	Indian Allotment (No. 062008)	Group C	C1: Raymond & Irene Ignacio	BIA-Tribe	2 frame houses	Corrals, sheds	2 acre farm
	SUBTOTALS	3 RESIDENCE GROUPS		5 HOUSEHOLDS		7 RESIDENCES		
NM-8717	T. 20 N., R. 5 W.							
	Sec. 35: NE¼	Indian Allotment (No. 434)	Group A	A1: Marie Sandoval A2: Velma Toledo A3: Wayne Toledo	BIA-Tribe	1 hogan 1 frame house 1 frame house	Corrals, Shed	Water line
	SUBTOTALS	1 RESIDENCE GROUP		3 HOUSEHOLDS		3 RESIDENCES		
NM-8715	T. 20 N., R. 7 W.							
	Sec. 3: SE¼	Indian Withdrawal (FLO 2198)	Group A	A1: Tom Tomasito	BIA-Tribe	2 frame houses		
	SUBTOTALS	1 RESIDENCE GROUP		1 HOUSEHOLD		2 RESIDENCES		

APPENDIX F-1

(CONTINUED)

Lease Application No.	Legal Description	Surface Ownership	Residence Group	Head of Household	Livestock Permit	No. & Type of Residence	IMPROVEMENTS	
							Associated Structures	Other
NM-8130	T. 20 N., R. 7 W., Sec. 2: NE $\frac{1}{4}$	Indian Allotment (No. 302)	Group A	A1: Julia Tsosie A2: Martha Ramone A3: Alice Ramone A4: Albert & Martha Toledo A5: Chee Ramone	BIA-Tribe BIA-Tribe	1 frame house 2 hogans 1 frame house 1 hogan 1 frame house 2 hogans	Corrals	
	Sec. 12: NE $\frac{1}{4}$	Public Domain	Group B	B1: Marvin & Anna Dennison B2: Alice Jim B3: Jimmie Lamone	BIA-Tribe BIA-Tribe BIA-Tribe	1 hogan 1 frame house 1 hogan 1 frame house	Corrals	
SUBTOTALS						8 HOUSEHOLDS	12 RESIDENCES	
NM-8128	T. 21 N., R. 8 W., Sec. 10: SE $\frac{1}{4}$	Indian Allotment (No. 315)	Group A	A1: Mrs. Charley Brown A2: Hoskie Brown	BIA-Tribe	1 hogan 1 frame house 1 hogan 1 frame house	Corrals, sheds	Fenced garden
	Sec. 15: NE $\frac{1}{4}$	Indian Allotment (No. 308)	Group B	B1: Jack & Nancy Thomas	BIA-Tribe	2 hogans 1 frame house 1 trailer house	Corral	Fenced garden
	Sec. 15: NW $\frac{1}{4}$	Indian Allotment (No. 312)	Group C	C1: Bert Mescal	BIA-Tribe	1 frame house		
	Sec. 22: SW $\frac{1}{4}$	Public Domain	Group D	D1: Lucille Cayaditto	BIA-Tribe	1 frame house	Corrals	

APPENDIX F-1

(CONTINUED)

Lease Application No.	Legal Description	Surface Ownership	Residence Group	Head of Household	Livestock Permit	No. & Type of Residence	IMPROVEMENTS	
							Associated Structures	Other
NM-8128 (Cont'd)	Sec. 34: S $\frac{1}{2}$	Indian Allotment (No. 079848)	Group E	E1: Elise Mitchell E2: Mary Nelson E3: Shirley Nelson E4: Kee Nelson	BIA-Tribe	1 frame house 1 frame house 1 frame house 1 frame house		Red dog gravel
SUBTOTALS		5 RESIDENCE GROUPS		9 HOUSEHOLDS		14 RESIDENCES		
NM-3918	T. 22 N., R. 10 W.							
	Sec. 17: SW $\frac{1}{4}$	Public Domain	Group A	A1: Andy Tsosie	BLM	1 frame house	Corral	
	Sec. 19: SW $\frac{1}{4}$	Public Domain	Group B	B1: Willie Yazzie	BLM	1 frame house 1 trailer house	Corrals	
	Sec. 23: SE $\frac{1}{4}$	Public Domain	Group C	C1: Cecil Werito C2: Neilwood Willetto C3: Jim Beyale	BLM BLM BLM	1 frame house 1 frame house 2 frame houses	Corrals, Stalls, Sheds	
	Sec. 24: W $\frac{1}{2}$	Public Domain	Group D	D1: Mary Trujillo D2: Neilwood Willetto D3: Jim Beyale	(Cf. above) (Cf. above)	1 frame house 2 frame houses 1 frame house	Corrals, Sheds	
SUBTOTALS		4 RESIDENCE GROUPS		8 HOUSEHOLDS		11 RESIDENCES		

APPENDIX F-1

(CONCLUDED)

Lease Application No.	Legal Description	Surface Ownership	Residence Group	Head of Household	Livestock Permit	No. & Type of Residence	IMPROVEMENTS	
							Associated Structures	Other
<u>UNDERGROUND MINEABLE PRLA</u>								
NM-6801	T. 24 N., R. 13 W							
	Sec. 20: SW $\frac{1}{4}$	Navajo Tribe	Group A	A1: Ben Harris	BIA-Tribe	1 hogan 1 stone house	Corrals, Cellar- type shed	2 acre farm
				A2: Margery Begay	BIA-Tribe	1 trailer house	Corral, Cellar- type shed	
				A3: Anna Begay		1 trailer house	fenced area with loading dock	
				A4: Daniel Begay		1 hogan		
	Sec. 20: NE $\frac{1}{2}$	Navajo Tribe	Group B	B1: Unknown		1 frame house	Corral, fence	
SUBTOTALS		2 RESIDENCE GROUPS		5 HOUSEHOLDS		6 RESIDENCES		
TOTALS		18 RESIDENCE GROUPS		39 HOUSEHOLDS		55 RESIDENCES		

Source: BLM, Albuquerque District, Farmington Resource Area Files

APPENDIX F-2

APPENDIX F-2
NAVAJO OCCUPANCIES ON SURFACE MINEABLE TRACTS ON COMPETITIVE COAL LEASE TRACTS

TRACT NAME	Legal Description	Surface Ownership	No. of Residence(s)	Other
Pinehaven	T. 12 N., R. 18 W., Sec. 4: NW¼ Sec. 4: SW¼ Sec. 10: NE¼ Sec. 11: SW¼	Tribal Land	1	
		Private	4	
		Tribal Land	2	
		Indian Allotment	3	
	T. 13 N., R. 17 W., Sec. 16: Sec. 19: NE¼ Sec. 20: E½ Sec. 21: Sec. 30: NW¼ Sec. 31: NE¼ Sec. 32: SE¼	Tribal Land	50	
		Private	0	1 Large Building
		Indian Allotment	3	
		Tribal/Indian Allotment	6	
		Tribal Land	9	
		Private	1	
		Tribal Land	1	
	T. 13 N., R 18 W., Sec. 24: SW¼ Sec. 25: SE¼ Sec. 28: NW¼ Sec. 29: NE¼ Sec. 30: SE¼ Sec. 33: NW¼ Sec. 34:	Tribal Land	1	
		Tribal Land	1	
		Tribal Land	10	
		Tribal Land	2	
		Private	5	
		Tribal Land	4	
		Tribal Land	3	
		SUBTOTAL	106	
Sundance	T. 14 N., R. 17 W., Sec. 4: SW¼ Sec. 8: NE¼ Sec. 17: NE¼	Indian Allotment	2	
		Indian Allotment	3	
		Tribal Trust	2	
		SUBTOTAL	7	

APPENDIX F-2

(CONTINUED)

TRACT NAME	Legal Description	Surface Ownership	No. of Residence(s)	Other
Bread Springs #1	T. 14 N., R. 17 W.,			
	Sec. 9: SE $\frac{1}{4}$	Tribal Trust	8	
	Sec. 10: NW $\frac{1}{4}$	Public	3	
	Sec. 10: SW $\frac{1}{4}$	Indian Allotment	2	
	Sec. 16: E $\frac{1}{2}$	Tribal Trust/State Leased to Tribe	4	
		SUBTOTAL	17	
Twin Buttes	T. 14 N., R. 19 W.,			
	Sec. 2: NW $\frac{1}{4}$	Indian Allotment	5	
	Sec. 3: N $\frac{1}{2}$	2198	8	
	Sec. 4: E $\frac{1}{2}$	Indian Allotment	4	
	Sec. 9: E $\frac{1}{2}$	Indian Allotment	3	
	Sec. 10: SE $\frac{1}{4}$	Indian Allotment	4	
	Sec. 10: NW $\frac{1}{4}$	Indian Allotment	2	
	Sec. 10: SW $\frac{1}{4}$	Indian Allotment	2	
	Sec. 11: W $\frac{1}{2}$	2198	12	
	Sec. 14: E $\frac{1}{2}$	Indian Allotment	8	
	Sec. 15: W $\frac{1}{2}$	2198	8	
	Sec. 22: N $\frac{1}{2}$	Indian Allotment	5	
	Sec. 23: N $\frac{1}{2}$	2198	6	
	Sec. 26: NW $\frac{1}{4}$	Indian Allotment	2	
	Sec. 27: NW $\frac{1}{4}$	2198	10	
	Sec. 34: NW $\frac{1}{4}$	Tribal Trust	2	
	T. 15 N., R. 19 W.,			
	Sec. 34: NW $\frac{1}{4}$	Indian Allotment	4	
	Sec. 34: SW $\frac{1}{4}$	Indian Allotment	8	
		SUBTOTAL	93	

APPENDIX F-2

(CONTINUED)

TRACT NAME	Legal Description	Surface Ownership	No. of Residence(s)	Other
Divide	T. 15 N., R. 10 W., Sec. 4: NW $\frac{1}{4}$	Indian Allotment	<u>3</u> SUBTOTAL 3	
Hogback	T. 15 N., R. 18 W., Sec. 19: SW $\frac{1}{4}$ Sec. 24: NE $\frac{1}{4}$ Sec. 24: NW $\frac{1}{4}$ Sec. 24: SW $\frac{1}{4}$	Indian Allotment Private Indian Allotment Indian Allotment	14 1 <u>2</u> SUBTOTAL 17	Trailer court with approximately 150 trailers.
Samson Lake #2	T. 15 N., R. 19 W., Sec. 7: NW $\frac{1}{4}$ Sec. 8: SE $\frac{1}{4}$ T. 15 N., R. 20 W., Sec. 1: NW $\frac{1}{4}$ Sec. 2: SW $\frac{1}{4}$ Sec. 12: SE $\frac{1}{4}$	2198 Indian Allotment 2198 Tribal Trust Private	1 2 4 4 <u>4</u> SUBTOTAL 15	
Gamerco #1 (LC)	T. 16 N., R. 19 W., Sec. 28: SE $\frac{1}{4}$	Indian Allotment	<u>2</u> SUBTOTAL 2	
Gamerco #1 Bypass (HC)	T. 16 N., R. 19 W., Sec. 34: SW $\frac{1}{4}$	Indian Allotment	<u>2</u> SUBTOTAL 2	

(CONTINUED)

TRACT NAME	Legal Description	Surface Ownership	No. of Residence(s)	Other
Crownpoint Northeast	T. 18 N., R. 12 W.,			
	Sec. 6: SE $\frac{1}{4}$	Indian Allotment	3	
	Sec. 8: NW $\frac{1}{4}$	Indian Allotment	1	
	Sec. 20: SW $\frac{1}{4}$	Public	3 <u>b/</u>	
	Sec. 22: SW $\frac{1}{4}$	Homestead	2	
	Sec. 26: NE $\frac{1}{4}$	Indian Allotment	4	
	Sec. 26: SE $\frac{1}{4}$	Indian Allotment	1	
	Sec. 26: NW $\frac{1}{4}$	Indian Allotment	2	
	Sec. 28: NE $\frac{1}{4}$	Indian Allotment	1	
	Sec. 28: SE $\frac{1}{4}$	Indian Allotment	7	
	Sec. 28: SW $\frac{1}{4}$	Indian Allotment	4	
	Sec. 30: NE $\frac{1}{4}$	Indian Allotment	1	
	Sec. 30: NW $\frac{1}{4}$	Indian Allotment	2	
	Sec. 31: NE $\frac{1}{4}$	Homestead	1	
	T. 18 N., R. 13 W.,			
	Sec. 22: SE $\frac{1}{4}$	Indian Allotment	4	
	Sec. 22: SW $\frac{1}{4}$	Indian Allotment	<u>1</u>	
		SUBTOTAL	37	
Johnson Trading Post	T. 19 N., R. 3 W.,			
	Sec. 7: NW $\frac{1}{4}$	Indian Allotment	7	
	T. 19 N., R. 4 W.,			
	Sec. 9: NE $\frac{1}{4}$	Public	1 <u>b/</u>	
		SUBTOTAL	8	
Crownpoint East	T. 17 N., R. 11 W.,			
	Sec. 1: NE $\frac{1}{4}$	Indian Allotment	1	
	Sec. 2: SW $\frac{1}{4}$	Indian Allotment	4	
	Sec. 4: SW $\frac{1}{4}$	Indian Allotment	1	
	Sec. 11:	2198	<u>11</u>	
	Sec. 14: SE $\frac{1}{4}$	Tribal Trust	4	
	Sec. 22: NE $\frac{1}{4}$	Indian Allotment	3	
	Sec. 23: NE $\frac{1}{4}$	2198	<u>1</u>	
		SUBTOTAL	25	

APPENDIX F-2

(CONTINUED)

TRACT NAME	Legal Description	Surface Ownership	No. of Residence(s)	Other
STAR LAKE EAST #1	T. 19 N., R. 5 W.,			
	Sec. 5: NE $\frac{1}{4}$	Public	2	
	T. 20 N., R. 5 W.,			
	Sec. 33: SE $\frac{1}{4}$ Sec. 34: NW $\frac{1}{4}$ Sec. 35: NW $\frac{1}{4}$	Public Public Indian Allotment	1 2 <u>b/</u> 6	
			SUBTOTAL	11
Bisti #6	T. 23 N., R. 13 W.,			
	Sec. 15: NE $\frac{1}{4}$ Sec. 17: NW $\frac{1}{4}$	Indian Allotment Indian Allotment	1 1	
			SUBTOTAL	2
Bisti #2	T. 24 N., R. 13 W.,			
	Sec. 29: NW $\frac{1}{4}$ Sec. 31: NE $\frac{1}{4}$	Navajo Tribe Public	0 0	1 hogan used by Project Concern for dental work 2 buildings belonging to United Methodist Mission
			SUBTOTAL	0
			TOTAL RESIDENCES	345

Source: BLM, Albuquerque District, Farmington Resource Area Files

Note: a/ Unoccupied tracts: Catalpa Canyon, Lee Ranch East, Lee Ranch Middle, Lee Ranch West, Hospah #1, Star Lake West #2, Gallo Wash #1, Kimbeto #2, Bisti #1, Bisti #4, La Plata #1, La Plata #3.

b/ Located on or near the boundary of lands included in the proposed Navajo Exchange (See DOI, BLM, 1979).

APPENDIX F-3
NAVAJO OCCUPANCIES ON UNDERGROUND MINEABLE COMPETITIVE COAL LEASE TRACTS a/

TRACT NAME	LEGAL DESCRIPTION	SURFACE OWNERSHIP	NO. OF RESIDENCE(S)			
Tah-Ha-Ba Well	T. 14 N., R. 17 W.,					
		Sec. 6: E $\frac{1}{2}$	4			
	Sec. 6: NW $\frac{1}{4}$	3				
	T. 14 N., R. 18 W.,					
		2198		2		
		Indian Allotment		5		
		Indian Allotment		3		
	Indian Allotment		<u>4</u>			
	SUBTOTAL			21		
	Gamerco #2	T. 16 N., R. 19 W.				
			Private		3	
Indian Allotment				3		
Indian Allotment				4		
Indian Allotment				5		
Indian Allotment				5		
Indian Allotment				6		
Indian Allotment				1		
Indian Allotment				<u>8</u>		
SUBTOTAL			35			
Samson Lake #1			T. 15 N., R. 19 W.,			
				Tribal Fee		2
				Indian Allotment		5
				Indian Allotment		6

APPENDIX F-3

(CONTINUED)

TRACT NAME	LEGAL DESCRIPTION	SURFACE OWNERSHIP	NO. OF RESIDENCE(S)
Samson Lake #1 (Cont'd)	T. 15 N., R. 20 W.		
	Sec. 1: E $\frac{1}{2}$	2198	16
	Sec. 12: NE $\frac{1}{4}$	Private	2
	T. 16 N., R. 20 W.,		
	Sec. 36: SE $\frac{1}{4}$	Indian Allotment	<u>2</u>
		SUBTOTAL	33
<hr/>			
Star Lake East (LC)	T. 20 N., R. 5 W.,		
	Sec. 30: SW $\frac{1}{4}$	2198	<u>1</u>
		SUBTOTAL	1
<hr/>			
Gallo Wash #2	T. 21 N., R. 8 W.,		
	Sec. 10: NE $\frac{1}{4}$	Public	3 <u>b/</u>
	Sec. 11: NW $\frac{1}{4}$	Public	3 <u>b/</u>
		SUBTOTAL	6
<hr/>			
Kimbeto #1	T. 22 N., R. 10 W.,		
	Sec. 2: NW $\frac{1}{4}$	Indian Allotment	2
	Sec. 2: SW $\frac{1}{4}$	Indian Allotment	2
	Sec. 10: NE $\frac{1}{4}$	Indian Allotment	2
	Sec. 11: NW $\frac{1}{4}$	Indian Allotment	<u>2</u>
		SUBTOTAL	8

APPENDIX F-3

(CONTINUED)

TRACT NAME	LEGAL DESCRIPTION	SURFACE OWNERSHIP	NO. OF RESIDENCE(S)
Nageezi	T. 23 N., R. 10 W.,		
	Sec. 8: SW $\frac{1}{4}$	2198	1
	T. 24 N., R. 10 W.,		
	Sec. 28: NE $\frac{1}{4}$	Indian Allotment	2
	Sec. 29: NW $\frac{1}{4}$	Indian Allotment	1
	Sec. 30: NE $\frac{1}{4}$	Public	1
	Sec. 34: SW $\frac{1}{4}$	Indian Allotment	1
		SUBTOTAL	6
		TOTAL RESIDENCES	110

Source: BLM, Albuquerque District, Farmington Resource Area Files

Note: a/ Unoccupied tracts: Bread Springs #2, Hospah #2, La Plata #2, La Plata #4.
b/ Located on lands included in the proposed Navajo Exchange (See DOI, BLM, 1979).

APPENDIX F-4
NAVAJO GRAVESITES IN THE EIS REGION a/

APPENDIX F-4

Lease Application No./Tract Name	Legal Description b/	Surface Ownership	No. of Graves
<u>PRLAs</u>			
Surface Mineable			
NM-8128	T. 21 N., R. 8 W.	Indian Allotment/2198	2
NM-3918	T. 22 N., R. 10 W.	Public	4
Underground Mineable			
NM6803	T. 23 N., R. 11 W.	Public/Indian Allotment	4
NM-3836	T. 23 N., R. 11 W.	Public	1
			SUBTOTAL 11
<u>Competitive Tracts</u> (All Surface Mineable)			
Crownpoint Northeast	T. 18 N., R. 12 W.	Indian Allotment	2
Bisti #1	T. 23 N., R. 12 W.	Public	20-30 (Historic Battlefield) c/
Bisti #6/8	T. 23 N., R. 12 W.	Indian Allotment	3
			SUBTOTAL 25-35
			TOTAL REPORTED GRAVES 36-46

Source: BLM, Albuquerque District, Farmington Resource Area Files

Notes: a/ This area probably contains additional gravesites that are not presently known to the BLM.

b/ Section and quarter section designations have been omitted from this table.

c/ This reported battlefield site may contain both Navajo and Ute graves. The number of graves has not been confirmed by the BLM (See USDI, BLM, 1981a for additional information about the site).

APPENDIX F-5
NAVAJO SACRED SITES IN THE EIS REGION a/

Lease Application No./Tract Name	Legal Description b/	Surface Ownership	No. and Site Type
<u>PRLAs (All Surface Mineable)</u>			
NM-8130	T. 20 N., R. 8 W.	2198	1 Offering Point
NM-3919	T. 22 N., R. 10 W.	Public	1 Offering Point
NM-3918	T. 22 N., R. 10 W.	Public	1 Offering Point
NM-3755	T. 22 N., R. 11 W.	Public	1 Offering Point
SUBTOTAL			4
<u>Competitive Tracts Surface Mineable</u>			
Samson Lake #2	T. 15 N., R. 19 W.	(Boundaries Unknown)	1 Possible Offering Point
Bisti #1	T. 23 N., R. 12 W.	Private	1 Gathering Area
Bisti #4	T. 23 N., R. 12 W.	Public/2198	1 Gathering Area
<u>Underground Mineable</u>			
Star Lake East (LC)	T. 20 N., R. 5 W.	(Boundaries Unknown)	1 Sacred Area (type unknown)
SUBTOTAL			4
TOTAL REPORTED SACRED SITES			8

Source: BLM, Albuquerque District, Farmington Resource Area Files

Notes: a/ This area may contain additional sacred sites that are not presently known to the BLM. Ten to fifteen Navajo sacred sites have been estimated to occur on the PRLA Area (DOI, BLM, 1981).

b/ Section and quarter section designation have been omitted from this table.

APPENDIX G

AIR QUALITY

APPENDIX G-1

AIR QUALITY ANALYSIS ASSUMPTIONS AND METHODOLOGY

Two studies were used in the air quality impact analysis for this EIS. The first study (Pedco 1982) was a conservative screening analysis to determine if a mine or pair of mines had the potential to exceed the applicable ambient air quality standard. Those mines that showed a potential were then analyzed in more depth using a computerized dispersion model CDMQC (ECOS 1982).

Predictions of future effects upon air quality of development projects were based on an atomospheric dispersion modeling analyses of pollutants emitted within and adjacent to the affected areas. Atmospheric dispersion models require two basic types of input data: meteorological data, and pollutant concentrations at specified receptor points around the source. Models are specifically designed to efficiently assess air quality in terms of averaging periods specified in regulatory standards for the affected region, which are appropriate to the environmental conditions. The ECOS study addresses regional effects of hypothesized future mines in the San Juan Basin. The pollutant of concern is TSP; and the modeling region was made sufficiently large to encompass all areas potentially harmed by emissions from proposed coal leasing.

Emissions

Emissions from three types of sources were quantified to determine the air quality of the EIS area: coal mining, both surface and underground; coal transportation (hauling and transferring); and major point sources in the study area.

The major pollutant emitted by the coal mines is particulate emissions of fugitive dust. The mines in the EIS area whose emissions were quantified consist of surface mines and underground mines. The proposed mines consist of a total of 20 surface mine units, five of which would have associated underground mines.

Only fugitive dust emissions were computed for the coal mining activities because particulate matter is the only pollutant which is generated in large enough quantities to have a significant impact on regional air quality.

Proposed and Existing Mine Leases

Emissions of particulate matter from proposed surface and underground mines were calculated directly from geologic and production data for tracts in the San Juan Basin. These data were developed by the Minerals Management Service (MMS) of the Department of the Interior. To complete the emissions calculations, ECOS developed mining scenarios and parameters through discussions with MMS and BLM specialists familiar with the San Juan Basin. A detailed discussion of these assumptions and the resulting emissions data can be found in the Technical Report (ECOS 1982).

The emissions data were then compared with emissions data derived by PEDCO (1982). In the present study, one mine was assumed per tract for calculating potential project emissions. The calculated emissions were somewhat larger than those derived by PEDCO. The present study used the highest emission factors approved by EPA or, where lacking, those in other published studies, while assuming the high level of Best Available Control Technology required by EPA Region VIII.

Emissions calculated for each of the one or more tracts available for development as a single mine under each alternative were then analyzed in order to construct the full production emissions level for that mine and alternative. Most mines in the various project alternatives involved a single tract; and the estimated tract emissions were used for that mine. The mines/alternatives based upon multiple tracts, each with an MMS-defined optimum production rate, were assumed to operate at the rate based upon the largest tract. An operator will develop the most productive tract first to maximize early returns on investment; and this will basically set the subsequent level of coal production when mining adjacent tracts. It was assumed that mines also involving existing federal and state leases will produce at the level set by the largest BLM-proposed tract. This assumption was forced by the lack of data (i.e. proprietary) on coal production from existing leases.

Calculations for one mine (#16) for the various alternatives was more complex. One alternative (No. 3) would involve only existing leases for this mine. To derive the level of production for this mine for this alternative, the average production rate from tracts in each alternative involving BLM tracts was calculated. The smallest average from the Mine 16 BLM alternative was then chosen. In essence, all available data were simply averaged for lack of better information. This procedure was also used to calculate emissions for the No-Project Alternative (No. 1).

Two mines (#18 and #20) involved only existing lease tracts for all alternatives. Thus, all alternatives for these mines would have the same emissions as Alternative 1. An analysis of BLM mine data suggested the plausibility of using BLM-based mine data for other mines situated on the closest tracts (i.e. Mines 17, 19 and 20) (personal communication, Mr. James Edwards, MMS, Farmington District). Thus, Mine 18 for each alternative was assigned an emissions level equal to the average of Alternative 1 emissions for Mines 17 and 19; and those for Mine 20 were set equal to Alternative 1 emissions for Mine 19. Table 3 lists resulting emissions for each mine and alternative. Total emissions for each alternative, irrespective of location of emission source, can be derived by summing the data in each column. These sums are listed as the last row in the table.

Mines in the study area were modeled as point sources. An average emissions height of five meters was assumed for all sources from the mines. This height was derived after considering the size of storage piles and the heights of emissions from trucks and loading devices, crushing and sorting machinery, road repair equipment, etc.

Dispersion Modeling Methodologies

For assessment of annual average impacts, the EPA-guideline Climatological Dispersion Model (CDMQC) was used to predict cumulative concentrations of TSP resulting from each coal leasing alternative, together with emissions from other sources in the San Juan Coal Region.

CDMQC predicts annual average pollutant concentrations based on the steady-state Gaussian dispersion formulation. A technical description of the CDMQC model is provided in the Technical Report (ECOS 1982). The model was designed for assessment of gaseous pollutants; therefore, it was modified to simulate particulate fallout due to gravitational settling. Another modification to the model was the incorporation of an algorithm to calculate annual geometric mean concentrations, since federal and state TSP ambient air quality standards (AAQS) and PSD increments are not specified in terms of arithmetic averages but in geometric means. The modified CDMQC model can also predict concentrations at all grid points of a specified modeling grid and at specific receptor points. The gridded output was processed by a contouring computer program to generate isopleth maps.

In addition to annual average AAQ and PSD increment standards, there are also corresponding 24-hour average standards for TSP. A statistical model developed by Larsen (1971) of the U.S. EPA was used to generate maximum worstcase 24-hour concentrations for receptor points where high annual arithmetic means occur. This statistical procedure is described in the Technical Report.

Modeling Area

Figure 1 shows the spatial extent of the modeling area. The grid origin is located approximately at 652.5 kilometers (km) East, 3874.7 km North, in the Universal Transverse Mercator (UTM) coordinate system for Zone 12. It covers an area of 225 km by 210 km and includes all major emissions sources in the San Juan Coal Region. The modeling grid employs a 5 km resolution in each direction, and contains 45 by 42 (1890) grid cells. For assessment of potential impacts at PSD Class I areas (Mesa Verde National Park and San Pedro Parks Wilderness), and the Chaco Cultural National Historical Park Class II area, specific receptor points were used in the modeling to predict cumulative increments.

Within the selected modeling grid, emissions from baseline sources and proposed coal mines for each alternative were assigned to proper grid locations. For estimates of worst-case impacts, all emission sources were modeled as point sources.

Meteorological Inputs

The climatological dispersion model CDMQC requires the joint frequency of wind speed, wind direction and atmospheric stability as meteorological inputs. These data are in the form of the Stability Array (STAR) program available from the National Climatic Center. Within the selected modeling area, STAR data are available for the monitoring stations located at Farmington, Gallup and Grants. Since CDMQC can only accommodate a single STAR

deck, the STAR data obtained for these three stations were averaged for use in the modeling. The averaged STAR data were assumed to be representative of climatological dispersion conditions throughout the San Juan Coal Region, without consideration of subregional conditions.

Other meteorological inputs required by the CDMQC model include the mean afternoon and nocturnal mixing heights. Values of 2000 meters (m) and 200 m were assigned to these mixing heights.

Background Concentrations

To evaluate the effects of project pollutant emissions, particularly in relation to federal state air quality standards, it is necessary to know the pre-existing, or background, TSP concentrations. A value of 30 ug/m^3 was assumed to represent the annual background. This value corresponds closely to the average annual concentration observed by the state monitoring station at Zuni for the years 1977-1980, and is believed to be the most representative background value available. It was also used in the earlier screening analysis for the proposed coal mines conducted by PEDCO Environmental Inc. (1982).

Modeling Accuracy and Limitations

The modeling studies show the potential worst-case adverse consequences of the project on air quality in terms sufficient to provide an understanding of the types of adverse effects to be expected, their geographical extent, their degrees of intensity, and their relationships to regulatory standards. This information can be used to aid in selection of a preferred alternative, and to anticipate the nature of its impacts. It can also be used as a guide to more detailed future evaluation of the selected alternative and of its specific implementation features.

It must be understood, however, that the modeling studies were limited by various constraints, and the conclusions are consequently subject to limitations which should be borne in mind by the reader.

Only worst-case situations were evaluated, because these are the most important in determining acceptable project limits. However, the worst-case results give no quantitative information on average impacts, or on best case situations, or on frequencies to be expected for worst, average, best, or any other circumstances.

Accuracy of modeling results obtained in this study is affected by a number of potential sources of error, including inaccuracies in modeling inputs and in the dispersion model itself. Particulate emission rates were generated by using mine design parameters estimated by the BLM, which may not be the actual values used by the mine developers. Emissions were also calculated based primarily on empirical emission factors developed for surface coal mines located in other western states (Wyoming, Colorado and Montana); hence, their applicability to coal mines in the San Juan Coal Region is assumed but has not been validated.

Accuracy of modeling results is also affected by the inherent limitations of the CDMQC model. The CDMQC model has not been thoroughly validated for air quality assessment of coal mine development. However, it is generally accepted that its predictions of annual average concentrations are accurate within a factor of two. Its predictions of 24-hour impacts may be less accurate, since they are based on a statistical relationship developed for urban areas. The statistical procedure also assumes that the modeled pollutant has a lognormal distribution for all averaging times. More realistic 24-hour impacts can only be predicted by using a short-term dispersion model and appropriate 24-hour meteorological scenarios. The CDMQC model was originally developed in an urban area and was not modified for use in a rural scenario.

APPENDIX G-1

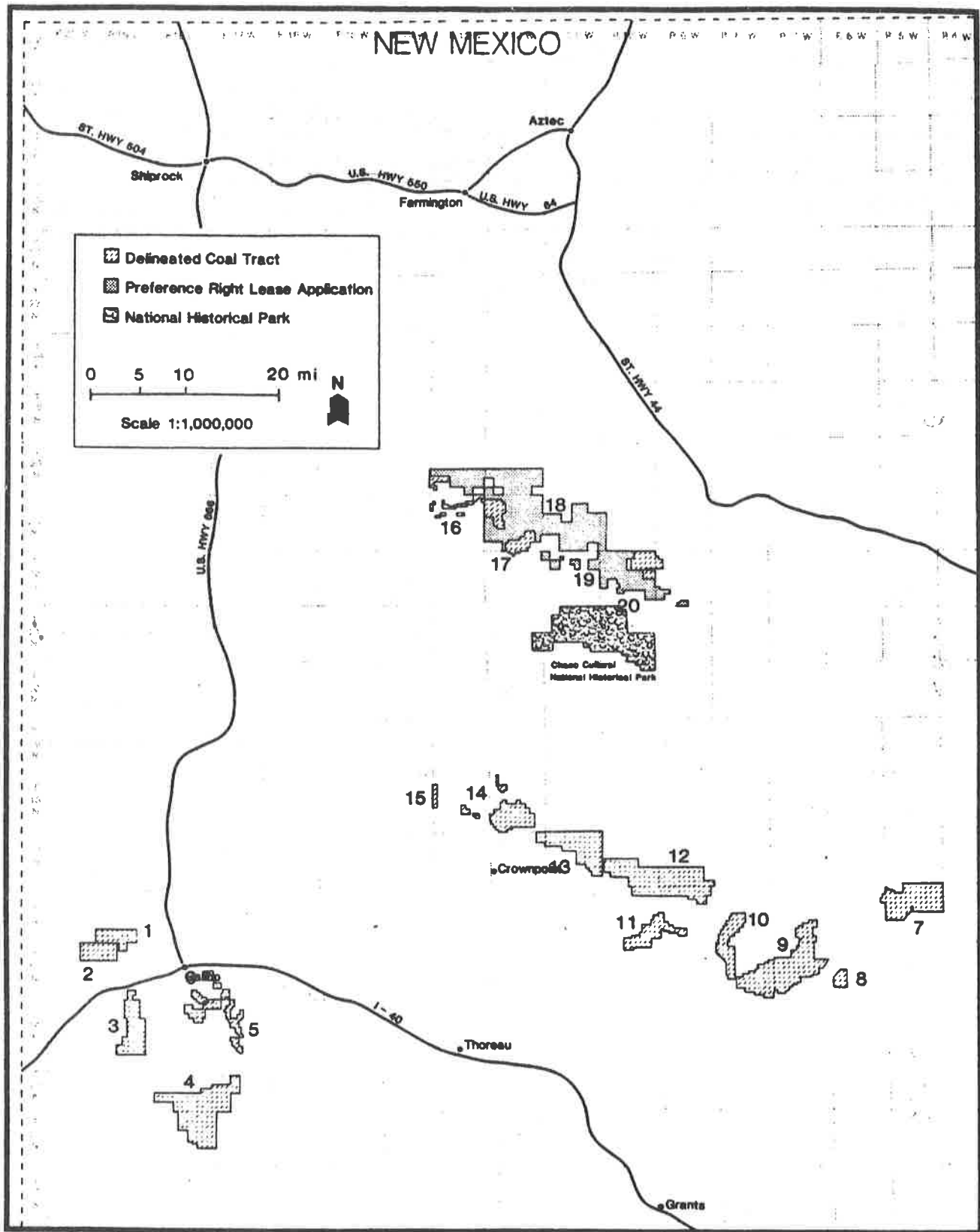


FIGURE G-1-1 SAN JUAN BASIN COAL REGION STUDY AREA

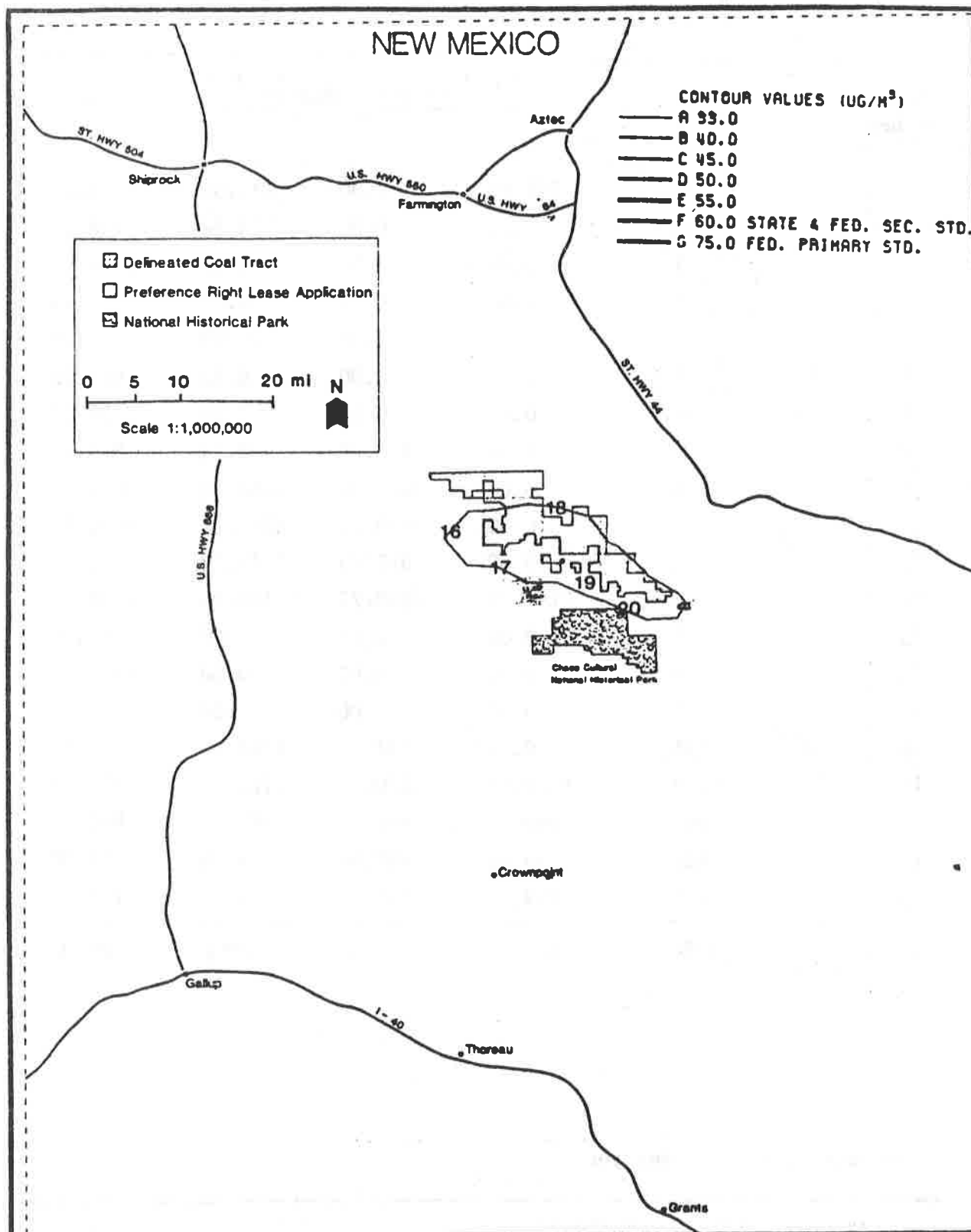
TABLE G-1-1

TSP EMISSIONS BY ALTERNATIVE*

Mine Number	Alternative Number				
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
1	0.	141.00	0.00	141.00	141.00
2	0.	0.00	0.00	118.22	118.22
3	0.	0.00	0.00	0.00	3174.57
4	0.	0.00	0.00	0.00	372.15
5	0.	0.00	0.00	215.09	215.09
6	0.	0.00	0.00	615.99	615.99
7	0.	0.00	0.00	0.00	2753.17
8	0.	0.00	673.28	673.28	673.28
9	0.	0.00	3682.30	3682.30	3682.30
10	0.	0.00	3838.31	3838.31	3838.31
11	0.	0.00	1979.73	1979.73	1979.73
12	0.	2198.28	2198.28	2198.28	2198.28
13	0.	0.00	0.00	0.00	368.95
14	0.	0.00	0.00	0.00	4735.83
15	0.	0.00	0.00	0.00	305.70
16	234.	279.35	234.	1763.62	1763.62
17	1120.	1120.07	1120.	1120.07	1120.07
18	940.	940.	940.	940.	940.
19	489.	759.06	759.06	759.06	759.06
20	759.	759.	759.	759.	759.
	<u>3542</u>	<u>6196</u>	<u>16183</u>	<u>18803</u>	<u>30514</u>

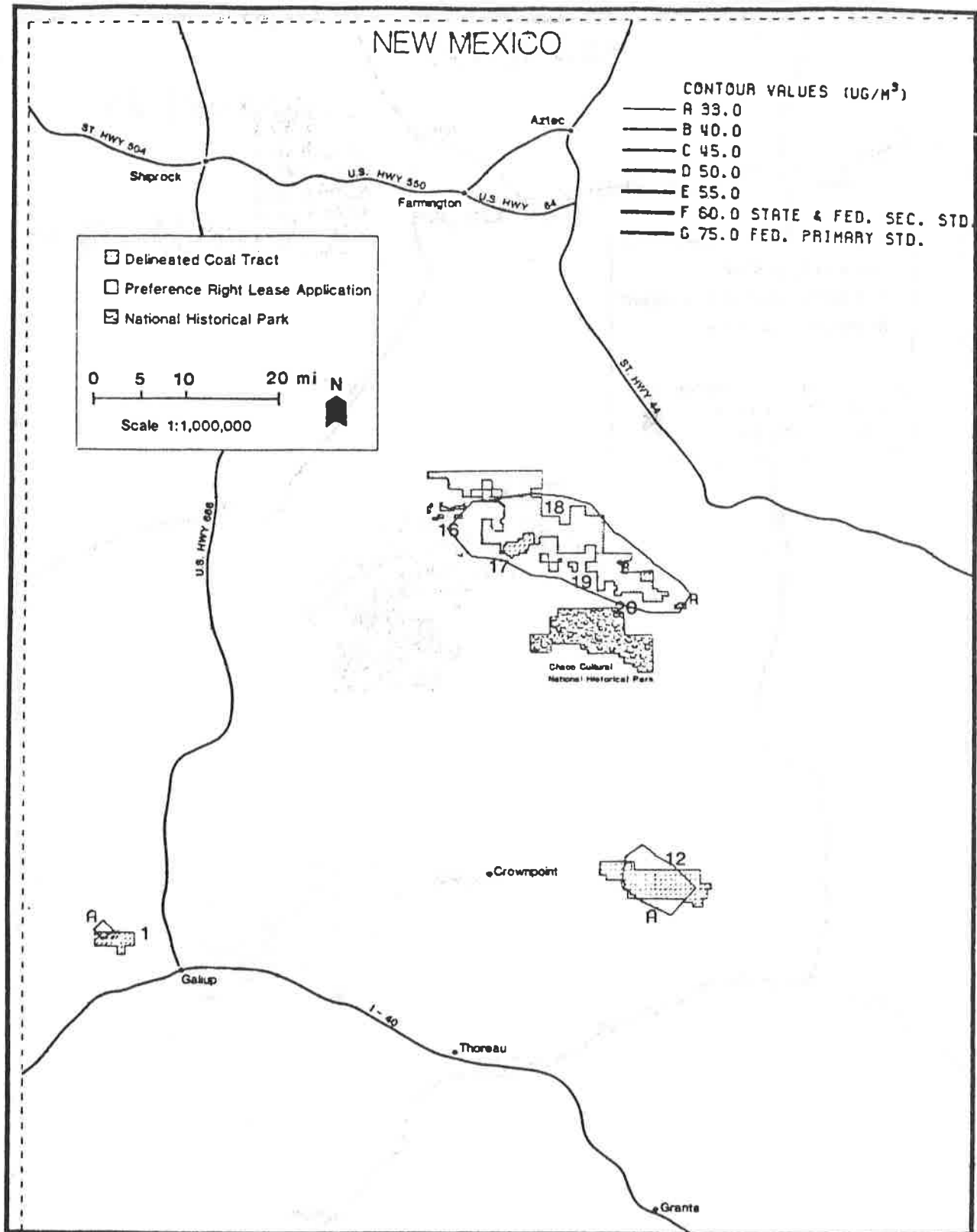
* Emissions in tons per year

APPENDIX G-1



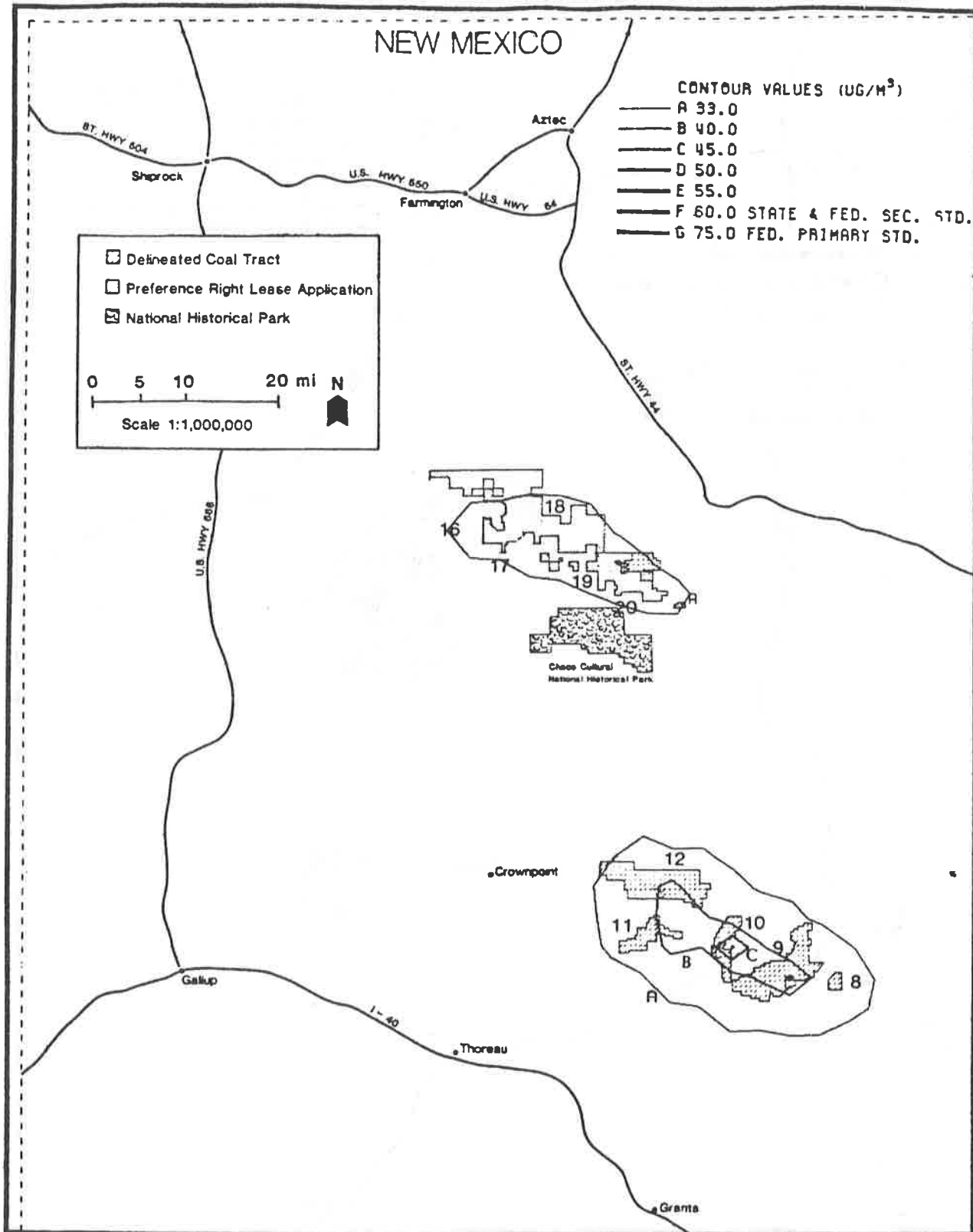
MAP G-1-1 ANNUAL AVERAGE AMBIENT TSP CONCENTRATION, NO ACTION ALTERNATIVE

APPENDIX G-1



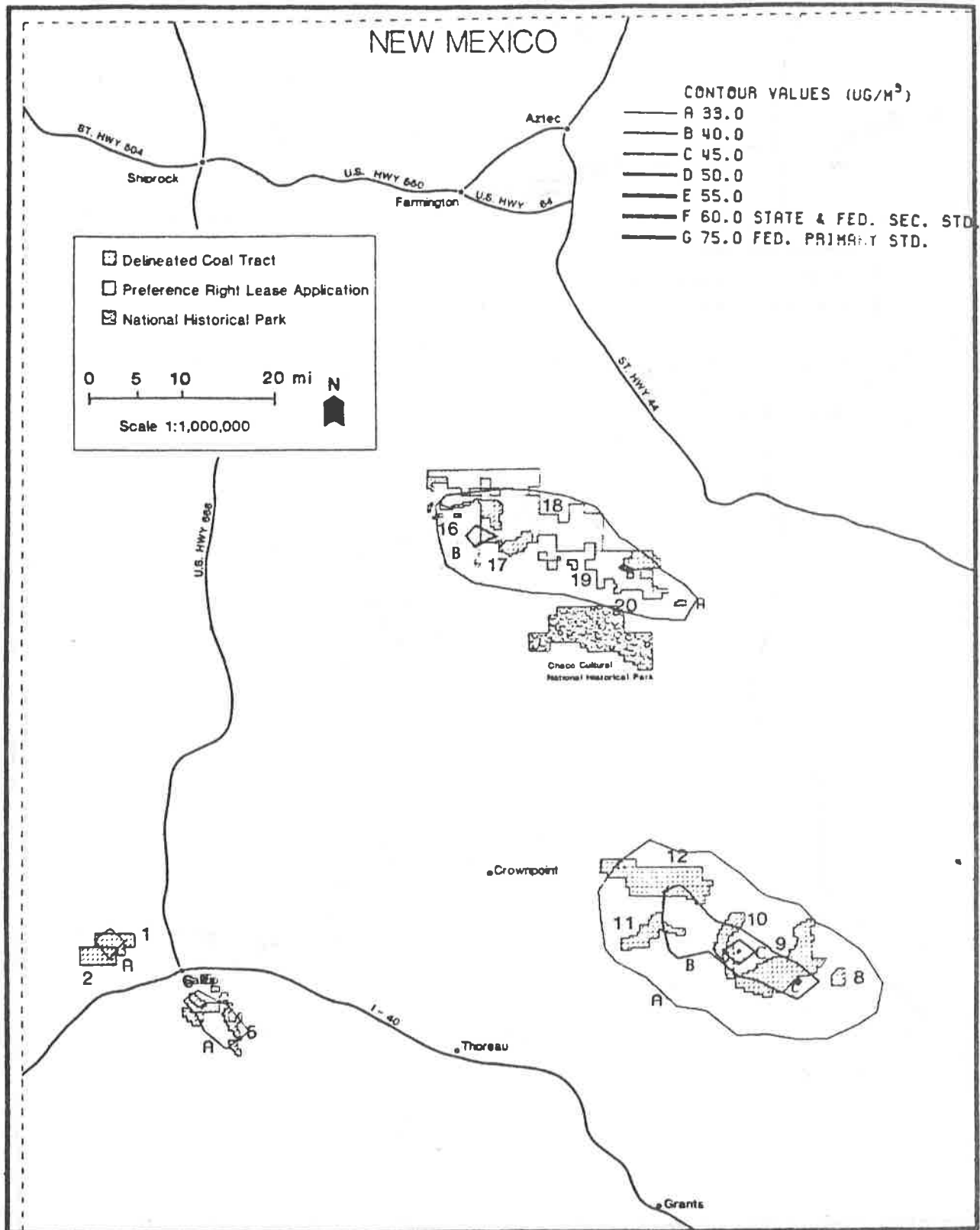
MAP G-1-2 ANNUAL AVERAGE AMBIENT TSP CONCENTRATION, BYPASS ALTERNATIVE

APPENDIX G-1



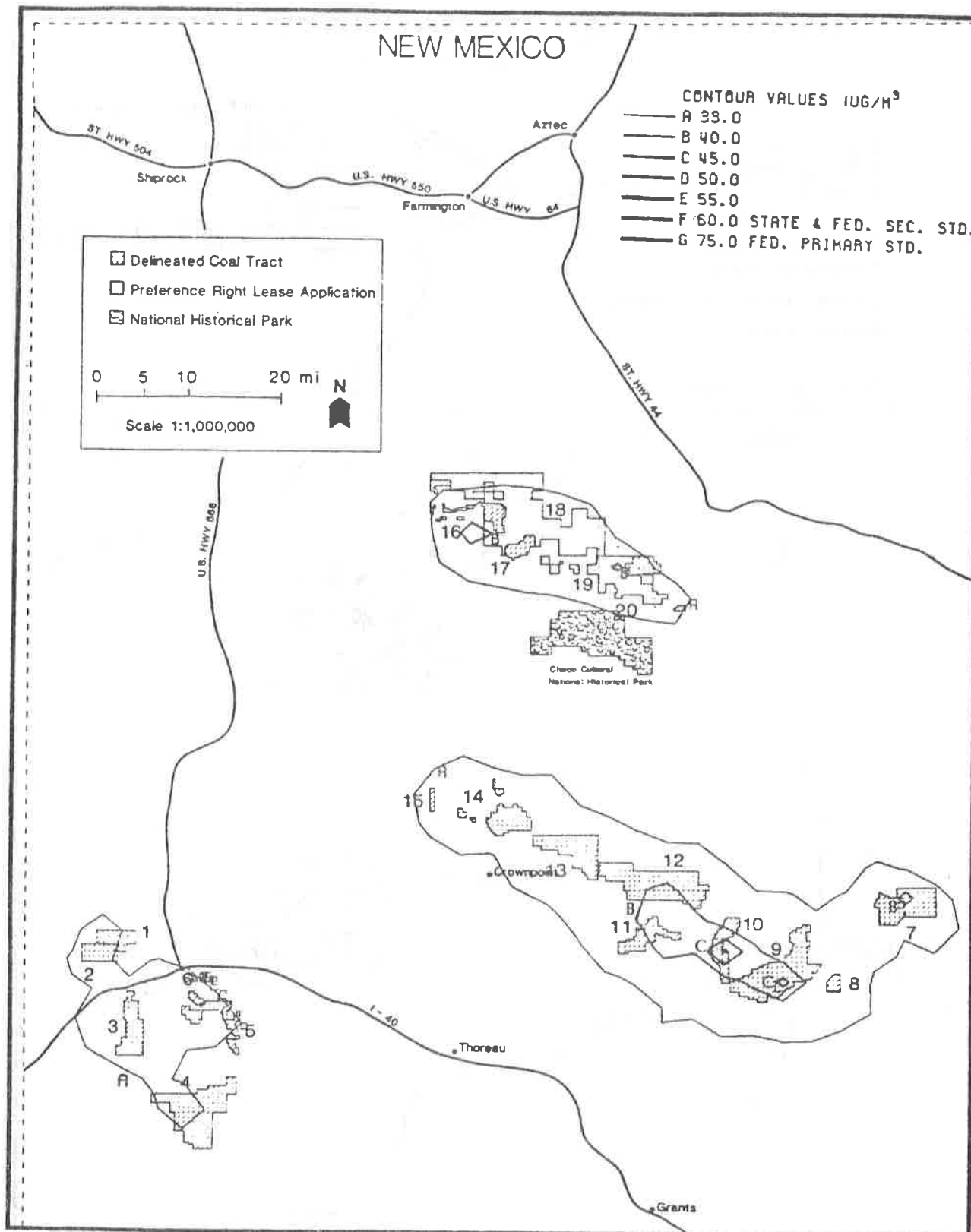
MAP G-1-3 ANNUAL AVERAGE AMBIENT TSP CONCENTRATION, MINIMUM SURFACE OWNER CONFLICT ALTERNATIVE

APPENDIX G-1



MAP G-1-4 ANNUAL AVERAGE AMBIENT TSP CONCENTRATION, TARGET ALTERNATIVE

APPENDIX G-1



MAP G-1-5 ANNUAL AVERAGE AMBIENT TSP CONCENTRATION, HIGH ALTERNATIVE

APPENDIX G-1

VISIBILITY

Visibility can be calculated using various methods. The method used by the Bureau of Land Management uses the ambient concentration of total suspended particulates as the variable.

The National Park Service used contrast ration in their calculations. Both methods involve some assumptions and will give different values.

The air quality modeling results for this EIS are increases to the ambient levels. These increases were used to compute the impacts to visibility for each of the alternatives. Using this method, the visibility can be calculated based on the current background of 30 mg/m³ and then the visibility can be calculated for each alternative based on the modeled increase in total suspended particulates. These values are intended to indicate the potential impact to visibility in the San Juan Basin as a result of the potential coal leases.

The use of this method allows the visibility impacts to be tracked with the increases in ambient increases.

APPENDIX H

SURFACE OWNER CONSULTATION LETTERS



APPENDIX H-1

United States Department of the Interior

IN REPLY REFER TO
3120

BUREAU OF LAND MANAGEMENT

P.O. BOX 568
FARMINGTON, NEW MEXICO 87401

CERTIFIED-RECEIPT REQUESTED

Dear Surface Owner:

The Bureau of Land Management has completed its land use planning for the area and is initiating actions necessary to consider issuing new competitive coal leases. These actions include tract delineation in conjunction with the U. S. Geological Survey, Site Specific Analysis and the San Juan River Regional Coal Environmental Impact Statement.

Our review of Federal and State records show that you own the surface over the following lands in which the United States has retained ownership of the mineral estate including the coal in and under the land:

You may meet qualifications under section 714 of the Surface Mining Control and Reclamation Act of 1977 (30 U.S.C. 1304) to be classed as a "surface owner." We would be happy to meet with you to discuss these qualifications. If you qualify, this classification gives you certain types of protection. Under current law, the Department cannot issue a new competitive lease and authorize a company to surface mine federal coal under your land without your permission. The Department may be proposing to lease the coal under your land in the near future.

The purpose of this letter is to consult with you and to give you a chance to tell us whether you would favor or oppose leasing of coal under your land. To assist you in understanding this process, I would like to tell you what your views will do and what they will not do.

(1) If you are in favor of leasing, you are not bound by that decision and you may still, at a later date, withhold your permission to leasing and prevent the Department from issuing a lease for the coal in these lands. However, if you have already given your written consent for surface coal mining on your land you may have lost the right to withhold your consent at a later date.

(2) If you express a preference against the Department's issuing a lease for coal under your land, the Department may or may not eliminate that land from further consideration for development. If at a later date you change your mind and favor leasing, the Department may reconsider whether the coal under your land should be leased.

(3) Even if you are in favor of leasing, the Department is under no obligation to offer the coal under your land for lease. The Department may decide that the lands should not be offered because of environmental problems. It may decide that other lands contain better coal and should be developed before the coal under your land. It may also decide that there is no need to lease that coal because other lands are already available for mining. The general question whether new coal leasing is needed on a national basis is now being studied by the Department.

I, or a member of my staff, would be happy to talk with you if you have any questions about this letter. Please feel free to call us. Your response to this letter is an important part of the leasing process and I want you to understand it completely.

Sincerely yours,

Richard T. Watts
Acting Area Manager

Enclosure



United States Department of the Interior

IN REPLY REFER TO
3120

BUREAU OF LAND MANAGEMENT

P.O. BOX 568
FARMINGTON, NEW MEXICO 87401

CERTIFIED-RECEIPT REQUESTED

Dear Surface Owner:

The Bureau of Land Management has completed its land use planning for the area and is initiating actions necessary to consider issuing new competitive coal leases. These actions include tract delineation in conjunction with the U. S. Geological Survey, Site Specific Analysis and the San Juan River Regional Coal Environmental Impact Statement.

Our review of Federal and State records show that you own the surface over the following lands in which the United States has retained ownership of the mineral estate including the coal in and under the land:

You may meet qualifications under section 714 of the Surface Mining Control and Reclamation Act of 1977 (30 U.S.C. 1304) to be classed as a "surface owner." We would be happy to meet with you to discuss these qualifications. If you qualify, this classification gives you certain types of protection. Under current law, the Department cannot issue a new competitive lease and authorize a company to surface mine federal coal under your land without your permission. The Department may be proposing to lease the coal under your land in the near future.

The purpose of this letter is to consult with you and to give you a chance to tell us whether you would favor or oppose leasing of coal under your land. To assist you in understanding this process, I would like to tell you what your views will do and what they will not do.

(1) If you are in favor of leasing, you are not bound by that decision and you may still, at a later date, withhold your permission to leasing and prevent the Department from issuing a lease for the coal in these lands. However, if you have already given your written consent for surface coal mining on your land you may have lost the right to withhold your consent at a later date.

(2) If you express a preference against the Department's issuing a lease for coal under your land, the Department may or may not eliminate that land from further consideration for development. If at a later date you change your mind and favor leasing, the Department may reconsider whether the coal under your land should be leased.

(3) Even if you are in favor of leasing, the Department is under no obligation to offer the coal under your land for lease. The Department may decide that the lands should not be offered because of environmental problems. It may decide that other lands contain better coal and should be developed before the coal under your land. It may also decide that there is no need to lease that question whether new coal leasing is needed on a national basis is now being studied by the Department.

It would be most helpful if you could return your response to this request on the attached form as soon as possible or within the next 30 days.

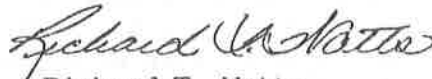
Our Navajo BLM personnel, Danny Charlie and Pauline McCauley are working with this consultation and you can contact them at 325-3581, Farmington Resource Area office.

Mrs. McCauley will be at the following location to explain this letter and answer any questions in reference to this letter.

Crownpoint BIA Conference Room, August 6, 1982, 8:00 a.m. to 3:00 p.m.

I, or a member of my staff, would be happy to talk with you if you have any questions about this letter. Please feel free to call us. Your response to this letter is an important part of the leasing process and I want you to understand it completely. We have enclosed a brochure on the rights of surface owners over Federal coal for your information.

Sincerely yours,



Richard T. Watts
Acting Area Manager

Enclosure

APPENDIX I
STANDARD COAL LEASE FORM
ADDITIONAL SPECIAL STIPULATIONS

APPENDIX I-1

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

Serial Number

COAL LEASE

This lease, is entered into on
Land Management, and

by the United States of America, the lessor through the Bureau of

and shall become effective on

the lessee,

(effective date).

Sec. 1. STATUTES AND REGULATIONS — This lease is issued pursuant and subject to the terms and provisions of the Mineral Leasing Act of February 25, 1920, 41 Stat. 437, as amended, 30 U.S.C. Sections 181-287 and 90 Stat. 1083-1092, hereafter referred to as the Act, and of the Surface Mining Control and Reclamation Act of 1977, 30 U.S.C. Section 1201 et seq., and the Mineral Leasing Act for Acquired Lands of August 7, 1947, as amended, 30 U.S.C. 351-359 et seq. This lease is subject to all regulations of the Secretary of the Interior (including but not limited to 30 CFR Part 211 and Chapter VII and 43 CFR Group 3400) which are now in force or (except as expressly limited herein) hereafter in force, and all such regulations are made a part hereof.

WITNESSETH:

Sec. 2. RIGHTS OF LESSEE — The lessor, in consideration of any bonus paid (or to be paid if deferred), rents and royalties and other conditions hereinafter set forth, hereby grants and leases to the lessee the exclusive right and privilege to mine and dispose of

containing _____ acres, more or less and, subject to the conditions, limitations and prohibitions provided in this lease and in applicable acts and regulations, the right to construct all works, buildings, structures, equipment, and appliances which may be necessary and convenient for the mining and preparation of the coal for market, and, subject to the conditions herein provided, to use so much of the surface as may reasonably be required in the exercise of the rights and privileges herein granted for a period of 20 years and so long thereafter as the condition of continued operation is met.

Sec. 3. DILIGENT DEVELOPMENT AND CONTINUED OPERATION — The lessee shall engage in the diligent development of the coal resources subject to the lease. After diligent development is achieved, the lessee shall maintain continued operation of the mine or mines on the leased lands. The terms diligent development and continued operation are defined in the applicable regulations in Titles 30 and 43 of the Code of Federal Regulations.

Sec. 4. BONDS — The lessee shall file with the appropriate Bureau of Land Management office a lease bond in the amount of _____ for the use and benefit of the United States, to insure payment of deferred bonus payments, rentals and royalties and to insure compliance with all other terms of this lease, the regulations and the Act (except for reclamation within the area covered by a surface mining permit issued under the permanent regulatory program by the regulatory authority) and, if appropriate, for the protection of the interests of the surface owners on the leased lands. An increase in the amount of the lease bond may be required by the lessor at any time during the life of the lease to reflect changed conditions.

Sec. 5. RENTAL — An annual rental of _____ for each acre or fraction thereof shall be paid in advance on or before each anniversary date of this lease. This section shall not be subject to revision except in the course of lease readjustment.

Sec. 6. PRODUCTION ROYALTY — The lessee shall pay a production royalty of _____ percent of the value of coal produced by strip or auger methods and _____ percent of the value of coal pro-

duced by underground mining methods. The value of coal shall be determined as set forth in 30 CFR 211. Production royalties paid for a calendar month shall be reduced by the amount of any advance royalties paid under this lease to the extent that such advance royalties have not been used to reduce production royalties in a previous month. However, production royalties payable after the 20th year of the lease shall not be reduced by advance royalties paid during the first 20 years of the lease. Production royalties shall be payable the final day of the month succeeding the calendar month in which the coal is sold, unless otherwise specified in 30 CFR 211. The royalty rates provided in this section shall not be subject to revision except in the course of lease readjustment.

Sec. 7. ADVANCE ROYALTY — Upon request by the lessee the District Mining Supervisor may accept, for a total of not more than 10 years, the payment of advance royalties in lieu of continued operation consistent with the regulations in 43 CFR 3473 and 30 CFR 211. The advance royalty shall be based on a percent of the value of a minimum number of tons which shall be determined in the manner established by the regulations in 30 CFR 211.

Sec. 8. METHOD OF PAYMENTS — The lessee shall make rental payments to the appropriate Bureau of Land Management office until production royalties become payable. Thereafter, all rentals, production royalties and advance royalties shall be paid to the appropriate office of the United States Minerals Management Service.

exploration plan. Exploration plans for leased lands covered by an approved mining permit shall be submitted to the Regional Director of the Office of Surface Mining in accordance with the regulations in 30 CFR Chapter VII. Exploration plans for leased lands not covered by an approved mining permit shall be submitted to the District Mining Supervisor in accordance with the regulations in 30 CFR 211.

Sec. 10. MINING PLAN — In accordance with the regulations in 30 CFR 211 and Chapter VII, the lessee shall submit a mining and reclamation plan not more than three years after the effective date of this lease. Mining operations shall not commence until after the mining and reclamation plan is approved. The mining and reclamation shall be conducted in accordance with the approved mining and reclamation plan. Exploration activities which were not included in the approved mining and reclamation plan require submittal of exploration plans in accordance with Section 9 of this lease.

Sec. 11. LOGICAL MINING UNIT (LMU) — This lease is automatically considered to be an LMU. This LMU may be enlarged, adjusted or diminished in accordance with the applicable regulations in Titles 10, 30, and 43 of the Code of Federal Regulations. The mining plan for the LMU shall require that the reserves of the LMU will be mined within a period of 40 years in accordance with 30 CFR 211 and 43 CFR 3400.0-5. The definition of LMU and LMU reserves and other applicable conditions are set forth in the regulations in 43 CFR 3400.0-5 and 3475, 30 CFR 211, and Title 10 of the Code of Federal Regulations.

Sec. 12. OPERATIONS ON LEASED LANDS — (a) In accordance with conditions of this lease, the exploration and mining and reclamation plans, the permit issued pursuant to 30 CFR Chapter VII, and all applicable acts and regulations, the lessee shall exercise reasonable diligence, skill, and care in all operations on leased lands. (b) The lessee shall minimize to the maximum extent possible wasting of the coal deposits and other mineral and nonmineral resources, including, but not limited to, surface resources which may be found in, upon, or under such lands.

Sec. 13. SPECIAL STATUTES — The lessee shall comply with the provisions of the Federal Water Pollution Control Act (33 U.S.C. 1151-1175) and the Clean Air Act (42 U.S.C. 7401 et seq.).

Sec. 14. AUTHORIZATION OF OTHER USES AND DISPOSITION OF LEASED LANDS — (a) The lessor reserves the right to authorize other uses of the leased lands by regulation or by issuing, in addition to this lease, leases, licenses, permits, easements, or rights-of-way, including leases for the development of minerals other than coal under the Act. The lessor may authorize any other uses of the leased lands that do not unreasonably interfere with the exploration and mining operations of the lessee, and the lessee shall make all reasonable efforts to avoid interference with such authorized uses.

(b) The lessor reserves the right: (i) to sell or otherwise dispose of the surface of the leased lands under existing law or laws hereafter enacted insofar as said surface is not necessary for the use of the lessee in the extraction and removal of the coal therein, or (ii) to dispose of any resource in such lands if such disposal will not unreasonably interfere with the exploration and mining operations of the lessee.

(c) If the leased lands have been or shall hereafter be disposed of under laws reserving to the United States the deposits of coal therein, the lessee shall comply with all conditions as are or may hereafter be provided by the laws and regulations reserving such coal.

Sec. 15. EQUAL OPPORTUNITY CLAUSE — The lessee will comply with all provisions of Executive Order No. 11246 of September 24, 1965, as amended, and the rules, regulations and relevant orders of the Secretary of Labor.

Sec. 16. CERTIFICATION OF NONSEGREGATED FACILITIES — By entering into this lease, the lessee certifies that he does not and will not maintain or provide for his employees any segregated facilities at any of his establishments, and that he does not and will not permit his employees to perform their services at any location under his control where segregated facilities are maintained. The lessee agrees that a breach of this certification is a violation of the Equal Opportunity clause of this lease. As used in this certification, the term "segregated facilities" means, but is not limited to, any waiting rooms, work areas, rest rooms and wash rooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive or are in fact segregated on the basis of race, color, religion, or national origin, because of habit, local custom, or otherwise. Lessee further agrees that (except where lessee has obtained identical certifications from proposed contractors and subcontractors for specific time periods) lessee will obtain identical certifications from proposed contractors and subcontractors prior to award of contracts or subcontracts exceeding \$10,000 which are not exempt from the provisions of the Equal Opportunity clause, that lessee will retain such certifications in lessee's files; and that lessee will forward the following notice to such proposed contractors and subcontractors (except where proposed contractor or subcontractor has submitted identical certifications for specific time periods). Notice to prospective contractors and subcontractors of requirement for certification of nonsegregated facilities. A *Certification of Nonsegregated Facilities*, as required by the May 9, 1967, or 32 F.R. 7439, May 19, 1967) on *Elimination of Segregated Facilities*, by the Secretary of Labor, must be submitted prior to the award of a contract exceeding \$10,000 which is not exempt from the provisions of the Equal Opportunity clause. Certification may be sub-

mitted either for each contract and subcontract or for all contracts and subcontracts during a period (i.e., quarterly, semiannually, or annually).

Sec. 17. EMPLOYMENT PRACTICES — The lessee shall pay all wages due persons employed on the leased lands at least twice each month in lawful money of the United States. The lessee shall grant all miners and other employees complete freedom to purchase goods and service of their own choice. The lessee shall restrict the workday to not more than 8 hours in any one day for underground workers, except in case of emergency. The lessee shall employ no person under the age of 16 years in any mine below the surface. If the laws of the State in which the mine is situated prohibit the employment, in a mine below the surface, of persons of an age greater than 16 years, the lessee shall comply with those laws.

Sec. 18. MONOPOLY AND FAIR PRACTICES — The lessor reserves full authority to promulgate and enforce orders and regulations under the provisions of Sections 30 and 32 of the Act (30 U.S.C. Sections 187 and 189) necessary to insure that any sale of the production from the leased lands to the United States or to the public is at reasonable prices, to prevent monopoly, and to safeguard the public welfare, and such orders and regulations shall upon promulgation be binding upon the lessee.

Sec. 19. TRANSFERS —

☐ This lease may be transferred in whole or in part to any person, association or corporation qualified under 43 CFR 3472.1-1 to hold a lease.

☐ This lease may only be transferred in whole or in part to another public body, or to a person who will mine the coal on behalf of and for the use of the public body, or to a person for the limited purpose of creating a security interest in favor of a lender who agrees to be obligated to mine the coal on behalf of the public body. The transferee must be qualified under 43 CFR 3472.

☐ This lease may only be transferred in whole or in part to other small businesses qualifying under 13 CFR 121 and 43 CFR 3472.2-2(c).

Any transfer of this lease in whole or in part is subject to the procedures and requirements for approval in the relevant regulations in 43 CFR 3400. A transfer will become effective on the first day of the month following its approval by the authorized officer, or, if the transferee requests, the first day of the month of the approval.

Sec. 20. RELINQUISHMENT OF LEASE — The lessee may file a relinquishment of the entire lease, a legal subdivision or aliquot part thereof, but not less than 10 acres, or any bed of the coal deposits therein. The relinquishment shall be filed in triplicate with the authorized officer. Upon the determination by the authorized officer that the public interest shall not be impaired, that all accrued rentals and royalties have been paid and that all of the obligations of the lessee under the regulations and the lease terms have been met, the relinquishment shall be accepted effective the date filed.

Sec. 21. NONCOMPLIANCE — Any failure to comply with the conditions of this lease, the approved exploration and mining and reclamation plans, the regulations, or applicable acts shall be dealt with in accordance with the procedures set forth in the regulations.

Sec. 22. WAIVER OF CONDITIONS — The lessor reserves the right to waive any breach of the conditions contained in this lease, except the breach of such conditions as are required by the Act, but any such waiver shall extend only to the particular breach so waived and shall not limit the rights of the lessor with respect to any future breach; nor shall the waiver of a particular breach prevent cancellation of this lease for any other cause, or for the same cause occurring at another time.

Sec. 23. READJUSTMENT OF TERMS AND CONDITIONS — (a) The lease is subject to readjustment on the 20th year after the effective date and on each 10th year thereafter. In order that the lease may be readjusted as close as possible to the dates when it becomes subject to readjustment, the lessor may propose the terms of readjustment of any conditions of this lease, including rental and royalty rates, before the 20th year after the effective date and before each 10-year interval thereafter. The authorized officer shall notify the lessee whether he intends to readjust the terms and conditions of the lease and, if he intends to readjust, the nature of the readjustments in accordance with the regulations in 43 CFR 3451. Unless the lessee, within 60 days after receipt of the proposed readjusted terms, files with the lessor an objection to the proposed readjusted conditions or relinquishes the lease as of the effective date of the readjustment, the lessee shall be deemed conclusively to have agreed to such conditions.

(b) If the lessee files objections to the proposed readjusted conditions, the existing conditions shall remain in effect until there has been an agreement between the lessor and the lessee on the new conditions to be incorporated in the lease, or until the lessee has exhausted his rights of appeal under Section 31 of this lease, or until the lease is relinquished, except that the authorized officer may provide in the notice of readjusted lease terms that the readjustment or any part thereof is effective pending the outcome of the appeal. If the readjusted royalty provisions are subsequently rescinded or amended, the lessee shall be permitted to credit any excess royalty payments against royalties subsequently due to the lessor.

Sec. 24. DELIVERY OF PREMISES — Upon termination of this lease for any reason, or relinquishment of a part of this lease, the lessee shall deliver to the lessor in good order and condition all or the appropriate part

Sec. 24. DELIVERY OF PREMISES — Upon termination of this lease for any reason, or relinquishment of a part of this lease, the lessee shall deliver to the lessor in good order and condition all or the appropriate part of the leased lands. Delivery of the leased lands shall include underground timbering and such other supports and structures as are necessary for the preservation of the mine or deposit, and shall be in accordance with all other applicable provisions of the regulations including 30 CFR 211 and Chapter VII, for the completion of operations and abandonment.

Sec. 25. PROPRIETARY INFORMATION — Geological and geophysical data and information, including maps, trade secrets, and commercial and financial information which the lessor obtains from the lessee shall be treated in accordance with 43 CFR Part 2, 30 CFR 211.6 and other applicable regulations. Total lease reserve figures developed from this information will not be confidential.

Sec. 26. LESSEE'S LIABILITY TO LESSOR — (a) The lessee shall be liable to the United States for any damage suffered by the United States in any way arising from or connected with the lessee's activities and operations under this lease, except where damage is caused by employees of the United States acting within the scope of their authority.

(b) The lessee shall indemnify and hold harmless the United States from any and all claims arising from or connected with the lessee's activities and operations under this lease.

(c) In any case where liability without fault is imposed on the lessee pursuant to this section, and the damages involved were caused by the action of a third party, the rules of subrogation shall apply in accordance with the law of the jurisdiction where the damages occurred.

Sec. 27. INSPECTIONS AND INVESTIGATIONS — (a) All books and records maintained by the lessee showing information required by this lease or regulations must be kept current and in such manner that the books and records can be readily checked at the mine, upon request, by the Regional Director or District Mining Supervisor or their representative.

(b) The lessee shall permit any duly authorized officer or representative of the lessor at any reasonable time (1) to inspect or investigate the leased lands, the exploration and mining and reclamation operations, and all surface and underground improvements, works, machinery, and equipment, and all books and records pertaining to the lessee's obligations to the lessor under this lease and regulations and (2) to copy, and make extracts from any such books and records.

Sec. 28. UNLAWFUL INTEREST — No member of, or Delegate to, Congress, or Resident Commissioner, after his election or appointment, either before or after he has qualified and during his continuance in office, and no officer, or employee of the Department of the Interior, except as provided in 43 CFR 7.4(a)(3), shall hold any share or part in this lease or derive any benefit therefrom. The provisions of Section 3741 of the Revised Statutes, as amended, 41 U.S.C. Section 22, and the Act of June 25, 1948, 62 Stat. 702, as amended, 18 U.S.C. Sections 431-433, relating to contracts, enter into and form a part of this lease insofar as they may be applicable.

Sec. 29. APPEALS — The lessee shall have the right of appeal (a) under 43 CFR 3000.4 from an action or decision of any official of the Bureau of Land Management, (b) under 30 CFR Part 290 from an action, order, or decision of any official of the Minerals Management Service, or (c) under applicable regulation from any action or decision of any other official of the Department of the Interior arising in connection with this lease, including any action or decision pursuant to Section 23 of this lease with respect to the readjustment of conditions.

Sec. 30. DEFERRED BONUS — This lease is issued subject to the payment of _____ by the lessee as a deferred bonus. Payment of the deferred bonus by the lessee shall be made on a schedule specified in Section 31 (Special Stipulations) of this lease.

Sec. 31. SPECIAL STIPULATIONS — (a) Cultural Resources - (1) Before undertaking any activities that may disturb the surface of the leased lands, the lessee shall conduct a cultural resource intensive field inventory in a manner specified by the authorized officer of the BLM or of the surface managing agency (if different) on portions of the mine plan area and adjacent areas, or exploration plan area, that may be adversely affected by lease-related activities and which were not previously inventoried at such a level of intensity. The inventory shall be conducted by a qualified professional cultural resource specialist (i.e., archeologist, historian or historical architect, as appropriate), approved by the authorized officer of the surface managing agency (BLM if the surface is privately owned), and a report of the inventory and recommendations for protecting any cultural resources identified shall be submitted to the Regional Director of the Office of Surface Mining (or the District Mining Supervisor if activities are associated with coal exploration outside an approved mining permit area) and the authorized officer of the BLM or the surface managing agency (if different). The lessee shall undertake measures, in accordance with instructions from the Regional Director (or the District Mining Supervisor if activities are associated with coal exploration outside an approved mining permit area), to protect cultural resources on the leased land. The lessee shall not commence the surface disturbing activities until permission to proceed is given by the Regional Director (or the District Mining Supervisor if activities are associated with coal exploration outside an approved mining permit area).

(2) The lessee shall protect all cultural resource properties within the lease area from lease-related activities until the cultural resource mitigation measures can be implemented as part of an approved mining and reclamation plan or exploration plan.

(3) The cost of conducting the inventory, preparing reports, and carrying out mitigation measures shall be borne by the lessee.

(4) If cultural resources are discovered during operations under this lease, the lessee shall immediately bring them to the attention of the Regional Director (or the District Mining Supervisor if activities are associated with coal exploration outside an approved mining permit area), or the authorized officer of the surface managing agency if the Regional Director, or District Mining Supervisor, as appropriate, is not available. The lessee shall not disturb such resources except as may be subsequently authorized by the Regional Director (or the District Mining Supervisor if activities are associated with coal exploration outside an approved mining permit area). Within two (2) working days of notification, the Regional Director (or the District Mining Supervisor if activities are associated with coal exploration outside an approved mining permit area) will evaluate or have evaluated any cultural resources discovered and will determine if any action may be required to protect or preserve such discoveries. The cost of data recovery for cultural resources discovered during lease operations shall be borne by the surface managing agency unless otherwise specified by the authorized officer of the BLM or of the surface managing agency (if different).

(5) All cultural resources shall remain under the jurisdiction of the United States until ownership is determined under applicable law.

(b) Paleontological Resources - (1) Before undertaking any activities that may disturb the surface of the leased lands, the lessee shall contact the Bureau of Land Management to determine whether the authorized officer will require the lessee to conduct a paleontological appraisal of the mine plan and adjacent areas, or exploration plan areas, that may be adversely affected by lease-related activities. If the authorized officer determines that one is necessary, the paleontological appraisal shall be conducted by a qualified paleontologist approved by the authorized officer of the surface managing agency (BLM if the surface is privately owned), using the published literature and, where appropriate, field appraisals for determining the possible existence of larger and more conspicuous fossils of scientific significance. A report of the appraisal and recommendations for protecting any larger and more conspicuous fossils of significant scientific interest on the leased lands so identified shall be submitted to the authorized officer of the surface managing agency (BLM if the surface is privately owned). When necessary to protect and collect the larger and more conspicuous fossils of significant scientific interest on the leased lands, the lessee shall undertake the measures provided in the approval of the mining and reclamation plan or exploration plan.

(2) The lessee shall not knowingly disturb, alter, destroy or take any larger and more conspicuous fossils of significant scientific interest, and shall protect all such fossils in conformance with the measures included in the approval of the mining and reclamation plan or exploration plan.

(3) The lessee shall immediately bring any such fossils that might be altered or destroyed by his operation to the attention of the Regional Director or the District Mining Supervisor, as appropriate. Operations may continue as long as the fossil specimen or specimens would not be seriously damaged or destroyed by the activity. The Regional Director or the District Mining Supervisor, as appropriate, shall evaluate or have evaluated such discoveries brought to his attention and, within five (5) working days, shall notify the lessee what action shall be taken with respect to such discoveries.

(4) All such fossils of significant scientific interest shall remain under the jurisdiction of the United States until ownership is determined under applicable law. Copies of all paleontological resource data generated as a result of the lease term requirements will be provided to the Regional Director or the District Mining Supervisor, as appropriate.

(5) The cost of any required salvage of such fossils shall be borne by the United States.

(6) These conditions apply to all such fossils of significant scientific interest discovered within the lease area whether discovered in the overburden, interburden, or coal seam or seams.

c) Deferred Bonus Payment Schedule:

THE UNITED STATES OF AMERICA

By _____
(Signing Officer)

(Title)

(Date)

WITNESS TO SIGNATURE OF LESSEE

(Signature of Lessee)

(Signature of Lessee)

APPENDIX I-2

SECTION 31(c). ADDITIONAL SPECIAL STIPULATIONS

The following stipulations are applicable only to the PRLAs listed after each stipulation.

The lease contains the rights-of-way shown in the attached decision. These rights-of-way shall be located when needed to allow coal mining operations. For those right-of-way grants which contains terms or conditions allowing the right-of-way to be modified, the right-of-way grantee shall pay all reasonable costs associated with relocation. For other right-of-way grants, the coal lessee shall pay all reasonable cost associated with the relocation.

[NM-585, 3918, 3919, 3754, 3755, 6801, 6802, 6804, 8130, 8715, 11670]

All right-of-way provisions and processing on Indian allotted and withdrawn Federal lands administered by the BIA will be subject to 25 CFR 161.

[All PRLAs]

The lease contains part of the approved right-of-way for the planned rail line of the Star Lake Railroad Company. The map in the attached decision shows the location of this right-of-way. The Star Lake Railroad right-of-way was granted for the purpose of transporting coal. Lands within the right-of-way are unsuitable for surface coal mining operations unless the lessee receives written permission from the right-of-way grantee and concurrence from the BLM allowing surface coal mining.

[NM-3752, 3754]

The lease contains the authorized occupied dwellings shown in the attached decision. An area within 300 feet of each of these dwellings is unsuitable for surface coal mining operations unless the lessee receives written permission from the owner allowing surface coal mining operations.

[NM-585, 8128, 8130, 8717, 6801]

The lease contains the unauthorized occupied dwellings shown in the attached decision. Unless otherwise agreed to by the residents, the lessee will relocate the residents of these dwellings in accordance with the following stipulations:

1. Residents and grazing areas shall be relocated within the individual Navajos' current Navajo Chapter.
2. Relocation details shall be worked out with the resident.
3. Relocations shall be staggered so that they do not all occur at the same time.

4. Families shall be relocated as a unit and not be split up.
5. The new location should have sufficient water and forage to accommodate displaced flocks or herds.

[NM-585, 3918, 8128, 8130, 8715]

The lessee shall conduct a detailed survey for gravesites on areas that will be disturbed by surface coal mining. The BLM shall approve the survey. Surveys for gravesites on Indian allotted and withdrawn Federal lands administered by the BIA will be approved by the BIA. The survey shall be completed before the lessee applies for a permit under the Surface Mining Control and Reclamation Act. An area 100 feet surrounding each gravesite which may be disclosed by the survey shall be considered unsuitable for surface coal mining unless the lessee lawfully relocated the gravesite(s).

[All PRLAs]

A gravesite(s) has been located on the lease as shown in the attached decision. Unless the lessee lawfully relocates the gravesite(s), an area 100 feet surrounding the gravesite(s) is unsuitable for surface coal mining.

[NM-3836, 6803]

The area within 100 feet of a road(s) as shown in the attached decision is unsuitable for surface coal mining unless the road is relocated as allowed by the Surface Mining Control and Reclamation Act.

[NM-585, 3752, 3753, 3754, 3755, 3835, 3836, 3837, 3918, 3919, 6801, 6803, 6804, 8128, 8130, 11670]

As shown on the enclosed map in the attached decision portions of the lease are within a Wilderness Study Area and are unsuitable for surface coal mining operations while the Wilderness Study Area is under review by the Administration and the Congress. The De-na-zin WSA is suitable for underground coal mining with no surface occupancies or subsidence.

[NM-3834, 3838, 11916]

The lease contains identified sites, buildings, structures and objects of historic, archeological, and cultural significance on Federal lands which are included in or eligible for inclusion in the National Register of Historic Places. Surface coal mining operations on the identified sites will be allowed after the lessee carries out measures to avoid adverse effects to the sites in accordance with the plan approved by the Office of Surface Mining in consultation with the BLM or BIA (depending which is the surface managing agency) and State Historic Preservation Officer. The exact location and information on sites available to date are available from the Farmington Resource Area Archeologist of the Bureau of Land Management.

[NM-585, 3752, 3754, 3755, 3835, 3836, 3837, 3918, 3919, 6803, 8128, 8130, 8745]

The lease contains an active golden eagle nest as shown in the attached decision. The nest and buffer zone as shown in the attached decision are unsuitable for surface coal mining operations unless the BLM and the Fish and Wildlife Service concur that surface coal mining will not disturb the eagles during the breeding season or unless the BLM with the concurrence from the Fish and Wildlife Service determines that the nest will be moved.

The lease contains an active prairie falcon nest and a buffer zone as shown in the attached decision. This area is unsuitable for surface coal mining operations unless the BLM and the Fish and Wildlife Service concur that surface mining will not disturb the falcons during the breeding season.

[NM-3834]

The lease contains high priority habitat for migrating birds of high Federal interest (Ferruginous hawk nest sites and buffer zones) as shown in the attached decision. This area is unsuitable for surface coal mining operations unless the BLM and the Fish and Wildlife Service concur that surface coal mining will not disturb the birds during the breeding season.

[NM-3919, 3753, 3834, 3835, 11916]

The lease contains areas within the 100-year recurrence interval floodplains as shown on Federal Insurance Administration flood maps on file at the BLM Albuquerque District and in the attached decision. The surface management agency in consultation with the Minerals Management Service shall review the mining plan to be submitted by the lessee and specify any specific measures needed to ensure that mining will not cause a substantial threat of loss to people or property.

[NM-585, 3753, 3755, 3834, 3835, 3836, 3837, 3838, 3918, 3919, 6801, 6803, 6804, 8128, 8129, 8715, 8745, 9764, 11670]

The lessee shall protect the physical and legal availability of existing water sources in the lease application area. Any water removed or contaminated due to coal mining operations shall be replaced by the lessee. Although replacement water needed not be identical to the original water source, it shall be of equal quality and quantity or better.

[All PRLAs]

The lessee shall transfer any water wells drilled on BLM or BIA administered surface in the lease to the surface management agency upon expiration, termination, cancellation or relinquishment of the lease.

[All PRLAs]

The lessee shall return all lands affected by coal mining operations to the Visual Resource Management class or better which existed prior to mining. Surface structures associated with coal mining operations shall be painted a color that is similar to colors commonly found in the surrounding landscape, except where other colors are needed to meet safety requirements.

[All PRLAs]

Coal mining operations in the lease on lands within Known Geologic Structures of producing oil and gas fields shall not interfere with the economic recovery of oil and gas, except as determined by the Mineral Management Service.

[All PRLAs]

The portion of the lease as shown in the attached decision overlaps the Navajo Indian Irrigation Project. The lessee shall not conduct coal mining operations on this overlapping area until consultations between the lessee, NIIP, Minerals Management Service and BLM indicate that coal mining operations will not interfere with active intensive agriculture, as determined by the BIA's authorized officer in consultation with BLM.

[NM-6801, 11916]

At least 180 days prior to conducting coal mining operations in any section of land in the lease, the lessee shall notify the Navajo Nation, the Navajo Medicineman's Association, and the Navajo Chapter in which the lands are located of the scheduled coal mining activities. The lessee shall identify in the notification an individual from whom additional information can be obtained, if necessary. The purposes of this notification are to: 1) facilitate coordination through timely communication; 2) provide an opportunity for Navajo religious practitioners to conduct mitigatory actions for sacred and sensitive sites which are located in the area to be disturbed by coal mining. These actions may include the following: removal of sacred objects; selection of alternative locations for ritual activities; performance of appropriate ceremonies.

[All PRLAs]

The lessee shall conduct coal mining operations on the lands shown in the attached decision in a manner which minimizes adverse impacts to the recreational, scenic and scientific values recognized in the proposed Bisti/De-na-zin Area of Critical Environmental Concern, as determined by the authorized officer of the BLM after consultation with the Minerals Management Service.

[NM-3834, 3838, 6801, 11916]

The lessee shall not conduct coal mining operations on lands shown in the attached decision until the BLM has received from the lessee a completed study on the excavation and extraction of the paleontological resources found on these lands or until September 21, 1991, whichever comes first, as determined by the BLM's authorized officer. Exploration may be allowed during this period at the discretion of the Minerals Management Service with concurrence from the BLM.

[NM-3752, 3753, 3835]

A portion of the lease shown in the attached decision contains a traditional Navajo religious area. The affected portion of the lease is closed to Off-Road Vehicle (ORV) use, no new roads or trails will be authorized, existing access will be maintained, and no surface disturbance activities will be allowed.

[NM-8130]

APPENDIX J

NET ENERGY ANALYSIS

NET ENERGY ANALYSIS

The accompanying "net energy analyses" estimate the amount of energy in the coal produced on the Preliminary Coal Lease Tracts, the energy expended in its production, and the energy in the coal left in the ground as not being economically recoverable.

The energy input shown as required for "production and transportation" includes all energy required to produce the coal and transport it to a rail shipping point. This comprises fuel used directly or as electricity for mine production, truck transportation of coal, and transportation of personnel and supplies, and also the energy used for manufacturing or constructing the mining and transportation equipment and facilities needed and for manufacturing supplies. Also included is the petroleum used in hydraulic fluids, lubricants, and explosives and the hydrocarbons in feedstocks used in supply manufacture.

The energy input shown as required for "infrastructure" includes the energy consumed as electricity, natural gas, heating oil, and gasoline by mine employees and families, by a similar number of service employees in the production area who support them and by a proportionate number of commercial establishments. Also included is the energy consumed by workers producing the equipment and supplies used for coal production and by the service employees and commercial establishments that support them.

Estimates of electricity, fuel and mining supply consumption and of mine equipment and facility depreciation are based on figures and examples provided in Instruction Memorandum No. 83-368, Energy Analysis in Regional Coal Environmental Impact Statement and Instruction Memorandum No. CO-81-302, Net Energy Analysis.

Nationwide and statewide averages of energy minerals used per dollar-added-in-manufacturing were used to estimate the energy consumed in manufacturing equipment and supplies for which only a dollar measure of quantity is reported in statistical abstracts. Similar National and State averages of electricity, natural gas, and gasoline used per household were used for estimating infrastructure consumption.

Energy consumption is considered as beginning for electricity with deliveries of coal or other fuels to the generating station, for petroleum products with deliveries to area suppliers, and for natural gas with deliveries to consumers. The analysis ends with the coal loaded in rail cars for shipment. Rail shipment of coal requires about 600 Btu's per ton mile in the form of direct energy and a similar amount is estimated as being consumed indirectly and by associated infrastructure. About one-half percent of the energy in coal is required to transport it 100 miles by rail.

NET ENERGY ANALYSIS
(BILLIONS OF BRITISH THERMAL-UNITS (BTU'S))

Alternative	Output (Total)	Input (Total)	Ratio
No Action	0	0	0
Bypass	2.0322×10^{15}	5.8927×10^{13}	34.5:1
Minimum Surface Owner Conflict	1.2895×10^{16}	5.2607×10^{14}	24.5:1
Target	1.9107×10^{16}	6.7898×10^{14}	28.2:1
High	2.5773×10^{16}	8.1289×10^{14}	31.7:1

GLOSSARY

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ACRE-FOOT. The volume of water that would cover one acre to a depth of one foot. It is equivalent to 43,560 cubic feet.

ACTIVITY OCCASIONS. One person participating in one recreation activity during 12 or more hours of one day.

ALKALI SOIL. A soil with a high degree of alkalinity (pH of 8.5 or higher) or with a high exchangeable sodium content 215 percent or more of the exchange capacity), or both. A soil that contains sufficient alkali sodium to interfere with the growth of most plants.

ALLOTMENT. An area of land designated and managed for grazing of livestock.

ALLUVIUM. Clay, silt, sand, gravel, or other materials transported by flowing water and deposited in comparatively recent geologic time sorted or semisorted sediments in riverbeds, estuaries, and flood plains, on lakes, shores, and in fans at the base of mountain slopes.

ANIMAL UNIT MONTH (AUM). Amount of forage required to sustain one cow or its equivalent for a period of one month. This is approximately 720-780 pounds dry weight forage per month. AUM equivalents are: 1 horse = 1 cow; 5 sheep = 1 cow; 5 goats = 1 cow; 2 elk = 1 cow; and 5 deer = 1 cow.

AQUIFER. A geologic unit which contains water and which is permeable enough to transmit that water to wells and springs. A bedrock aquifer consists of consolidated rock; an alluvial aquifer consists of unconsolidated valley-fill deposits

AREA OF CRITICAL ENVIRONMENTAL CONCERN (ACEC). An area within the public lands where special management attention is required (when such areas are developed or used, or where no development is required) to protect the area and prevent irreparable damage to important wilderness, cultural, recreational, paleontological, or scenic values, fish and wildlife resources, or other natural systems or processes, or to protect life and safety from natural hazards.

ARTESIAN CONDITIONS. Ground water which is under sufficient pressure (always greater than atmospheric) to rise above the top of the aquifer when tapped by a well. This ground water does not necessarily rise to or above the land surface. A flowing artesian well flows at the land surface. Artesian is synonymous with confined.

ASSOCIATED (SOIL). A group of soils geographically associated in a characteristics repeating pattern and defined and delineated as a single map unit.

AVAILABLE WATER. The portion of water in a soil that can be readily absorbed by plant roots.

AVAILABLE WATER CAPACITY. The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil.

BADLANDS. Steep or very steep, commonly nonstony barren land dissected by many intermittent drainage channels. Badland is most common in semiarid and arid regions where streams are entrenched in soft geological material. Local relief generally ranges from 25 to 500 feet. Runoff potential is very high, and geologic erosion is active.

BASKETMAKER. Basketmaker sites are Anasazi sites dating from about 500 B.C. to A.D. 750 representing the development of Pueblo agriculturalism and permanent habitation sites.

BEDROCK. The solid rock that under lies the soil and other unconsolidated material or that is exposed at the surface.

BIOTA. All the microorganism, fauna and flora associated within a given environment.

BLOWN-OUT LAND. Areas from which all or almost all of the soil and soil material has been removed by wind erosion. A miscellaneous land type.

BONITO PHASE. The period from between approximately A.D. 900-1125 when the Chacoan Anasazi constructed the "Great Pueblos" which are believed to have been public buildings associated with a complex social system involving Chacoan Outliers.

BRITISH THERMAL UNIT (Btu). The quantity of heat required to raise the temperature of one pound of water one degree Fahrenheit at or near 39.2 degrees Fahrenheit.

BROWN SOILS. A great soil group of the temperate to cool arid regions, composed of soils with a brown surface and a light-colored transitional subsurface horizon. They develop under short grasses.

BULK DENSITY (SOIL). The mass of dry soil per unit bulk volume including the air space.

CHACOAN OUTLIERS. More than 70 prehistoric pueblo communities connected by a system of roads and visual communication into a sophisticated socioeconomic complex centering on the Chaco Culture National Historical Park (ca. A.D. 828-1178).

CLINKER. Remnants of burned coal.

COARSE-TEXTURED SOIL. Sand or loamy sand.

COLLUVIUM. Soil material or rock fragments, or both, moved by creep, slide, or local wash and deposited at the bases of steep slopes.

COMPONENT. The assemblage of artifacts left by each of two or more cultural groups using a single site at different periods.

CONDENSATE. A liquid obtained by condensation of a gas or vapor.

CRETACEOUS. Period of geologic time known as the "Age of the Dinosaurs", 130-63 m.y.

DECLARED UNDERGROUND WATER BASIN. An area in New Mexico declared by the State Engineer when he feels that management controls of ground water are necessary.

EOLIAN SOIL MATERIAL. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

EPHEMERAL STREAM. A stream that flows only in response to a storm.

EROSION. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

EXCHANGE CAPACITY. The capacity of a soil to exchange ions as measured by the quantity of exchangeable ions in that soil.

FACIES. The aspect belonging to a geologic unit of sedimentation, including mineral composition, type of bedding, fossil content, etc.; also a stratigraphic body as distinguished from other bodies of differing appearance or composition.

FERTILITY (SOIL). The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable

FINE TEXTURED. Sandy clay, silky clay, and clay.

FLOODPLAIN. A strip of relatively flat alluvium that borders a stream and is subject to repeated flooding.

FLUVIAL. Of or pertaining to a river or rivers. Produced by the action of a stream or river.

GROUND-WATER DISCHARGE. The process of depletion of ground water from an aquifer.

GROUND-WATER FLOW. The movement of ground water within an aquifer.

GROUND-WATER RECHARGE. The process of replenishing ground water in an aquifer.

HOMESTEAD. Usually 640 acres of public land obtained by an individual filing for title in accordance with homestead laws administered by the BLM. An individual must have resided on the land and constructed a certain number of improvements to obtain title. Title to Indians qualified for homesteads was usually issued as a Trust Patent. A Trust Patent is issued in the name of an individual Indian, but the land is held in trust by the United State and administered by the BIA.

HORIZON (SOILS). A layer of soil, approximately paralld to the surface, having distinct characteristics produced by soil-forming processes.

INDIAN ALLOTMENT. The act of February 8, 1887 made provision for Indians not living upon a reservation or for whose tribe a reservation had not been provided. Indians settled upon public land not otherwise taken were entitled upon application to have land allotted to them. Allotment titles were issued under Trust Patent.

INFILTRATION. The downward entry of water into the soil.

INFILTRATION RATE. A soil characteristic determining or describing the maximum rate at which water can enter the soil under specified conditions, including the presence of an excess of water.

IMMATURE SOIL. A soil with indistinct or only slightly developed horizons because of the relatively short time it has been subjected to the various soil-forming processes.

INVENTORY. A descriptive listing and documentation, including photographs and maps, of cultural resources; included are the processes of locating, identifying, and recording sites, structures, buildings, objects, and districts through library area archival research, information from persons knowledgeable about cultural resources and varying levels of intensity of on-the-ground field surveys.

LENTICULAR. Having the shape of a double-convex lens.

MONOCLINE. A geologic structure (series of strata) dipping only in one direction.

NATIONAL REGISTER OF HISTORIC PLACES. The official list, established by the Historic Preservation Act of 1966, of the nation's cultural resources worthy of preservation. The Register lists archaeological, historic, and architectural properties (i.e., districts, sites, buildings, structures, and objects) nominated for their local, State or national significance by State and/or Federal agencies and approved by the National Register staff.

NATIONAL REGISTER QUALITY. Those cultural resource properties which meet the National Register criteria and have been determined eligible for nomination to the National Register of Historic Places by virtue of their local, State, or national significance.

NAVAJO. The largest Indian tribe in the United States. Entering the southwest ca. A.D. 1500 as nomadic hunter/gatherers, by A.D. 1696 the Navajo had turned to the herding/gardening economy practice by many tribal members today.

OUTCROP. That part of a geologic formation or structure that appears at the surface of the earth.

OVERBURDEN. Unconsolidated rock material overlying a mineral deposit and which must be removed prior to mining.

PARENT MATERIAL. The unconsolidated organic and mineral material in which soil forms.

PERMEABILITY (SOIL). The ease with which gases, liquids, or plant roots penetrate or pass through a bulk mass of soil or a layer of soil.

P.L.O. 2198 LANDS. Public domain lands originally granted to the railroad. In 1921 these lands were reconveyed back to the federal government and other lands selected by the railroad in an attempt to consolidate railroad grant and Indian lands into solid blocks of holdings. Under Public Land Order 2198 these reconveyed lands were set aside for Indian use and placed under the administration of the BIA. The BIA issues 90-day revocable homesite leases on 2198 lands.

POROSITY. The amount of open pore space in a consolidated or unconsolidated geologic formation.

PREFERENCE RIGHT LEASE APPLICATION (PRLA). A formal request made to the BLM for a non-competitive coal lease. PRLAs were issued by the Secretary of the Interior in the San Juan Basin between 1971 and 1973 to the holders of prospecting permits. These individuals or companies were required to demonstrate that, during the period of the permit, they had discovered commercial quantities of coal.

PRODUCTIVITY (SOIL). The capacity of a soil for producing a specified plant or sequence of plants under a specified system of management.

PROFILE (SOIL). A vertical section of the soil extending through all its horizon and into the parent material.

PROVENIENCE. Source of origin of fossil material in relation to the depositional environment.

PUBLIC LANDS. Lands owned by the United States and managed by the Department of Interior, Bureau of Land Management.

RANK. A coal classification based on the degree of change in molecular structure of the coal, caused by great heat or pressure (metamorphism). There are four major ranks. The lowest rank, lignite, is the least metamorphosed while the highest rank, anthracite, is the most highly metamorphosed. Subbituminous is the rank just above lignite, with bituminous ranked above subbituminous. Ranking is determined by the number of Btu's in one pound of the coal being classified. The letter A, B, or C after a rank classification is a subdivision within that rank.

REGRESSIVE. Pertaining to a retreat or contraction of the sea from land areas.

RESIDUUM (RESIDUAL SOIL MATERIAL). Unconsolidated, weathered, or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

RIVER BASIN. The area drained by a river.

ROUGH BROKEN LAND. Land with very steep topography and numerous intermittent drainage channels but usually covered with vegetation.

RUNOFF. The precipitation discharged in stream channels from a drainage area.

SALVAGE. The recovery of material and data from an affected cultural resource, prior to its alteration or destruction, through, recordation documentation, partial or total excavation, and collection for analysis and interpretation.

SITE. A physical location utilized by human beings for a specific purpose. An archeological site is identified as having been used by humans in the past through the artifacts that remain.

SLICK SPOTS. Small areas that are slick when wet, due to a high content of alkali or of exchangeable sodium.

SLOPE. The inclination of the land surface from the horizontal.

SOIL. A natural, three dimensional body at the earth's surface that is capable of supporting plants and has properties resulting from the intergrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

SOIL (organic matter). The organic fraction of the soil that includes plant and animal residues at various stages of decomposition, cells and tissues of soil organisms, and substances synethesized by the soil population.

SPECIFIC CAPACITY. The rate of discharge of water from a pumping well divided by the water-level decline within the well.

SPOILS. Waste rock material generated by surface mining.

STRUCTURAL BASIN. A roughly bowl-shaped depression which is filled with sedimentary rocks. A structural basin owes its form to tectonic activity.

STRUCTURE (SOIL). The arrangement of primary soil particles into compound particles or aggregates.

SUBBITUMINOUS COAL. Coal having between 8,300 and 13,000 BTU per pound.

SUBSOIL. Technically, the B horizon; roughly the part of the solum below plow depth.

SUBSTRATUM. The part of the soil below the solum.

SUBSURFACE LAYER. Technically, A₂ horizon.

SURFACE SOIL. The uppermost part of the soil, ordinarily moved in tillage, or its equivalent in uncultured soils and ranging in depth from 3 to 4 inches to 8 to 10.

TEXTURE (SOIL). The relative proportions of sand, silt, and clay particles in a mass of soil.

TRANSGRESSIVE. Pertaining to a spread or extension of the sea over land areas.

TRANSMISSION LOSS. The process of seepage of surface-water flow into stream bed deposits.

TRANSMISSIVITY. The rate at which ground water is transmitted through a unit width of aquifer under a unit hydraulic gradient.

UPLAND (GEOLOGY). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

VISITOR-DAY. Twelve visitor-hours, which may be aggregated continuously, intermittently, or simultaneously by one or more persons. Visitor-days may occur either as recreation visitor-days or as non-recreation visitor-days.

VOLATILE. Changing readily to vapor.

VRM (VISUAL RESOURCE MANAGEMENT). The system by which the Forest Service and BLM classify and manage the visual resource of public lands under their respective jurisdictions. Based on their scenic qualities, sensitivities, and the distances from which they are viewed, the lands are classified into management units.

VRM CLASS I. A BLM visual resource management classification that allows for natural ecological change only.

VRM CLASS II. A BLM visual resource management classification that allows for management activities that are not visually evident.

VRM CLASS III. A BLM visual resource management classification that allows for management activities to be visually evident but subordinate to the landscape character.

VRM CLASS IV. A BLM visual resource management classification that allows for management activities to subordinate the landscape character.

VRM CLASS V. A BLM visual resource management classification that identifies areas where manmade disturbance is excessive and rehabilitation is necessary.

WATER TABLE CONDITIONS. Ground water which is under atmospheric pressure. This ground water does not rise above the top of the aquifer when tapped by a well. Water table is synonymous with unconfined.

WEATHERING. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents.

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PLATE 1. Projected drawdowns (in feet)

DRAFT the No Action Alternative.

EXPLANATION

10 Decline in water level, in feet. Contour interval is variable.

Outcrop area. Outcrops shown are for Jurassic rocks (Layers 1 and 3), Gallup Sandstone (Layer 5), and Mesaverde Group above the Gallup Sandstone (Layers 6 and 7).

Area where drawdowns may cause aquifer conditions to change from confined to unconfined (effectively increasing storage by a factor of 1000) and limit further drawdowns.

SCALE

0 6 12 18 MILES

1987

2000

2020

2040

UPPER MESAVERDE GROUP
(LAYER 7)

CREVASSE CANYON FORMATION
(LAYER 6)

GALLUP SANDSTONE
(LAYER 5)

WESTWATER CANYON MEMBER
OF MORRISON FORMATION
(LAYER 3)

ENTRADA SANDSTONE
(LAYER 1)

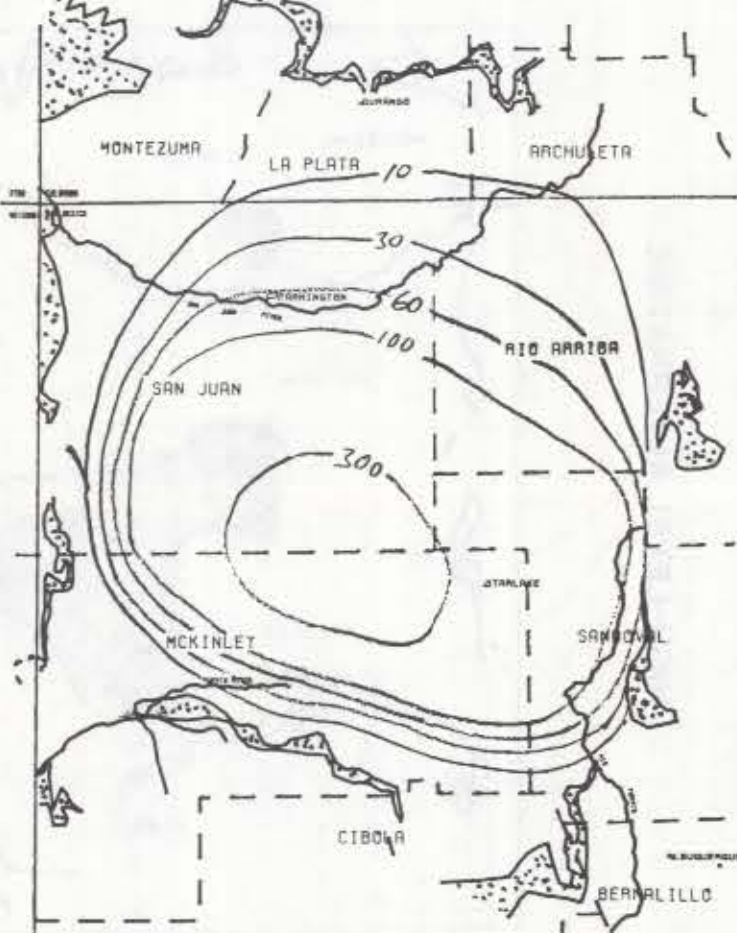
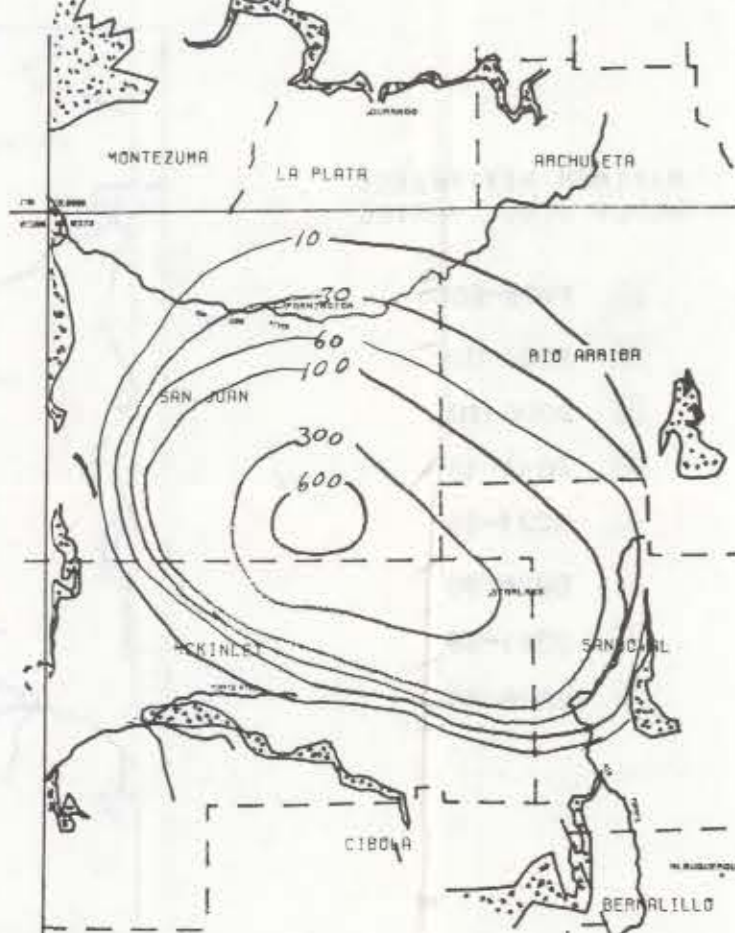
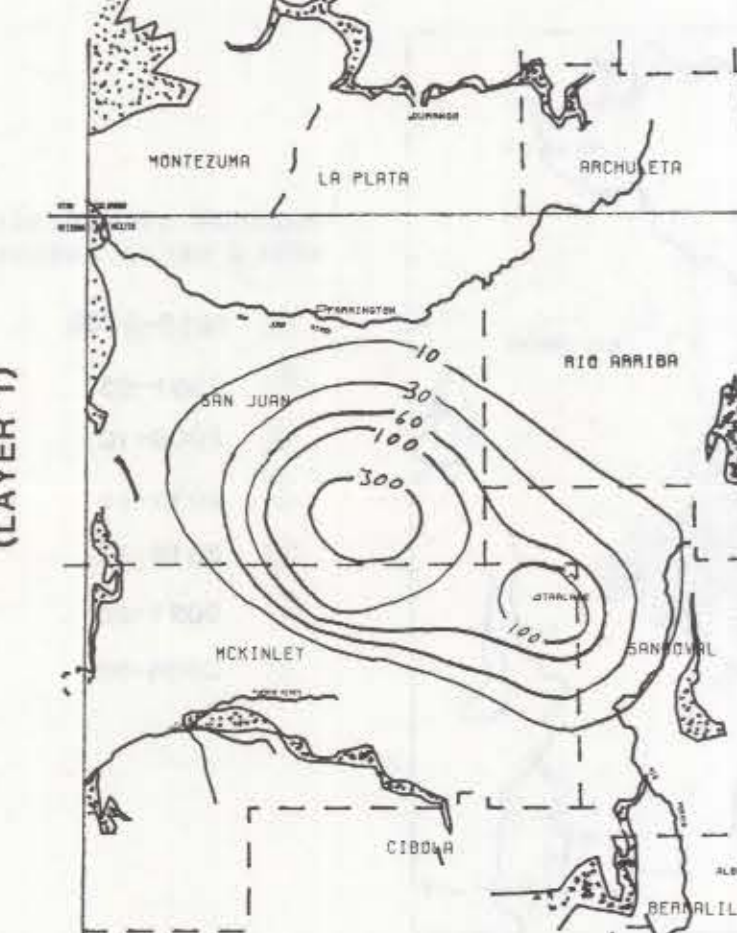
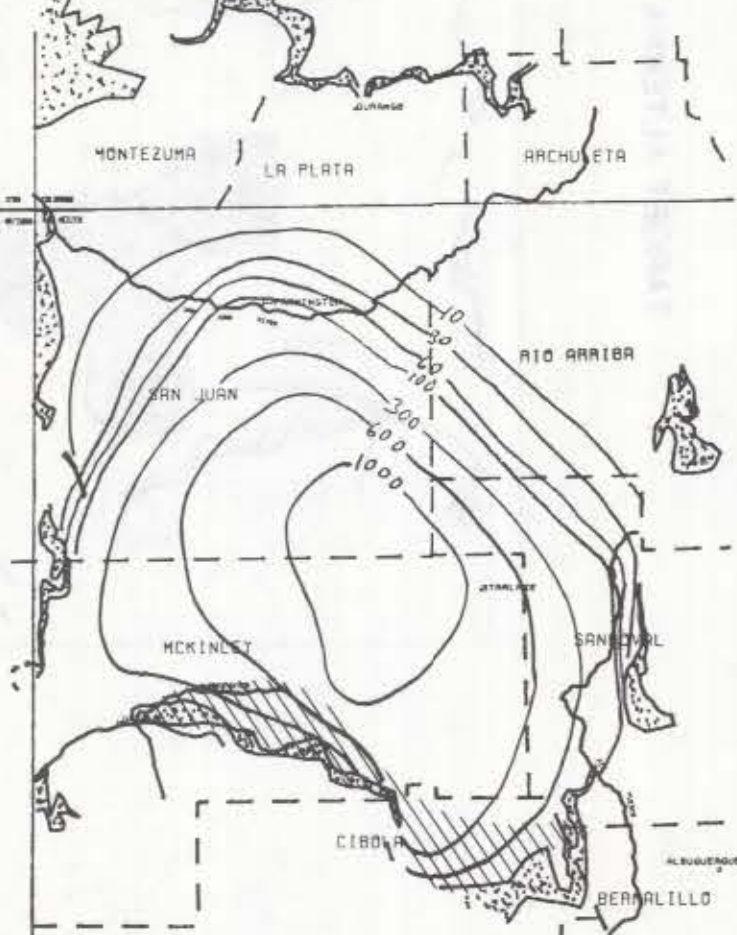
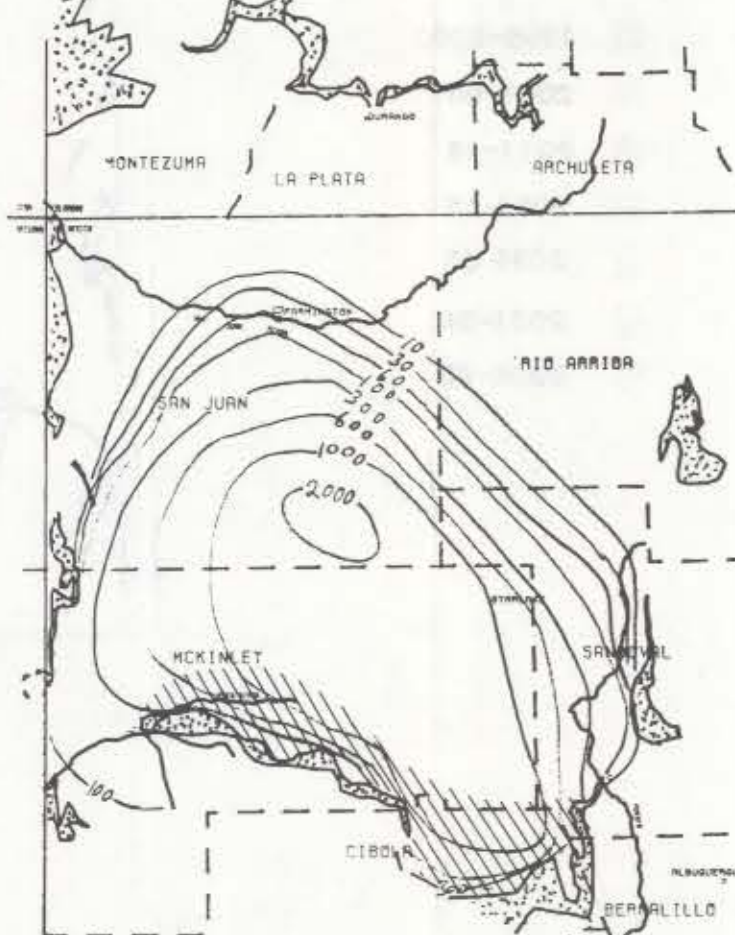
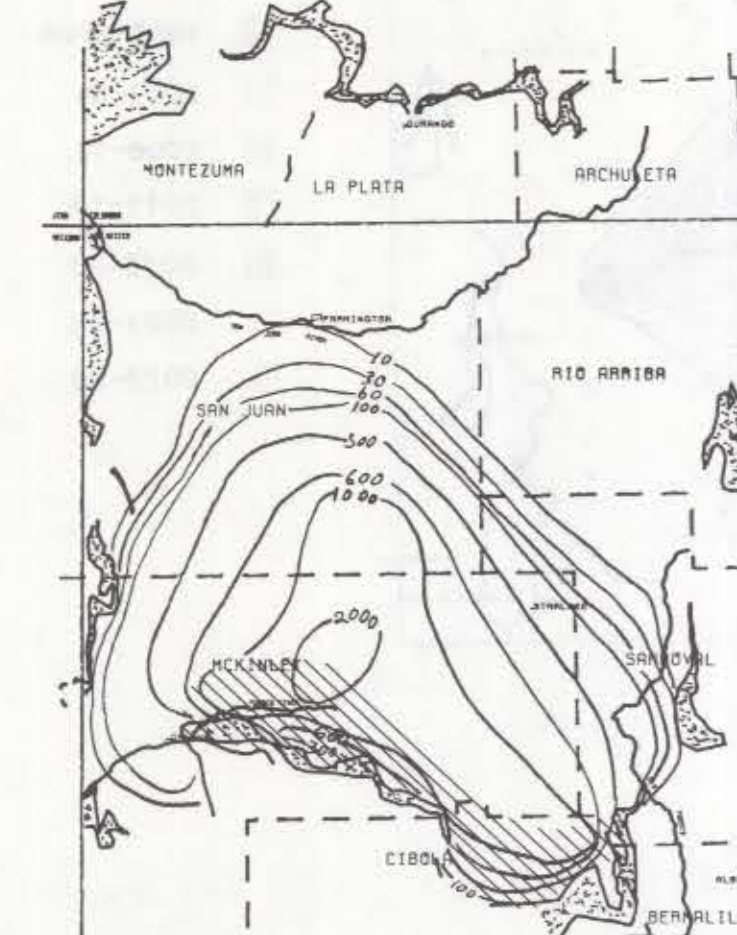
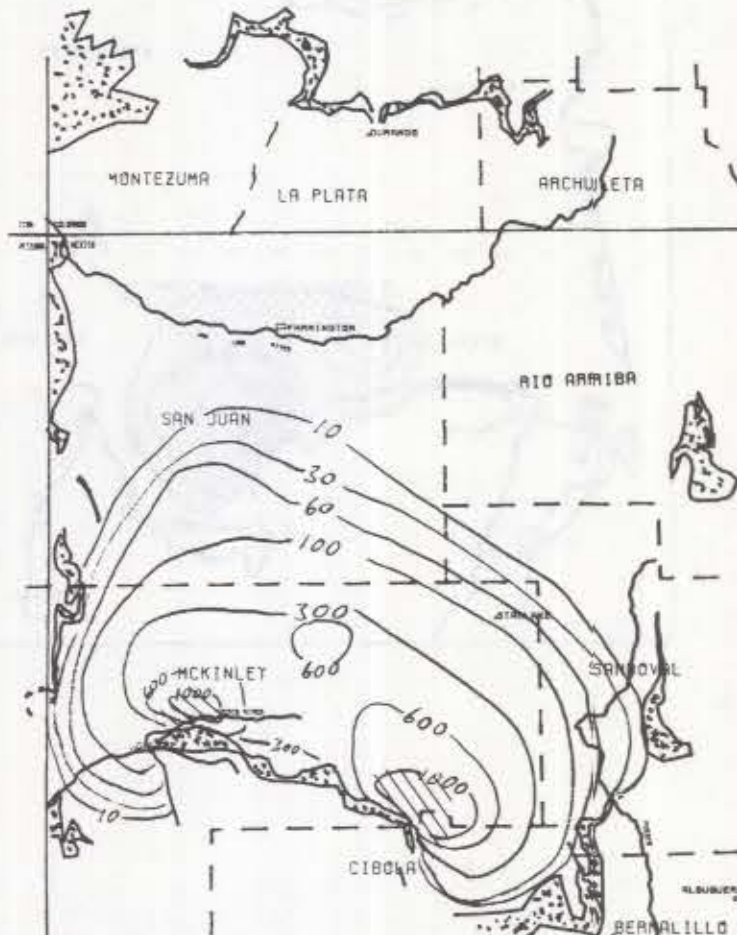
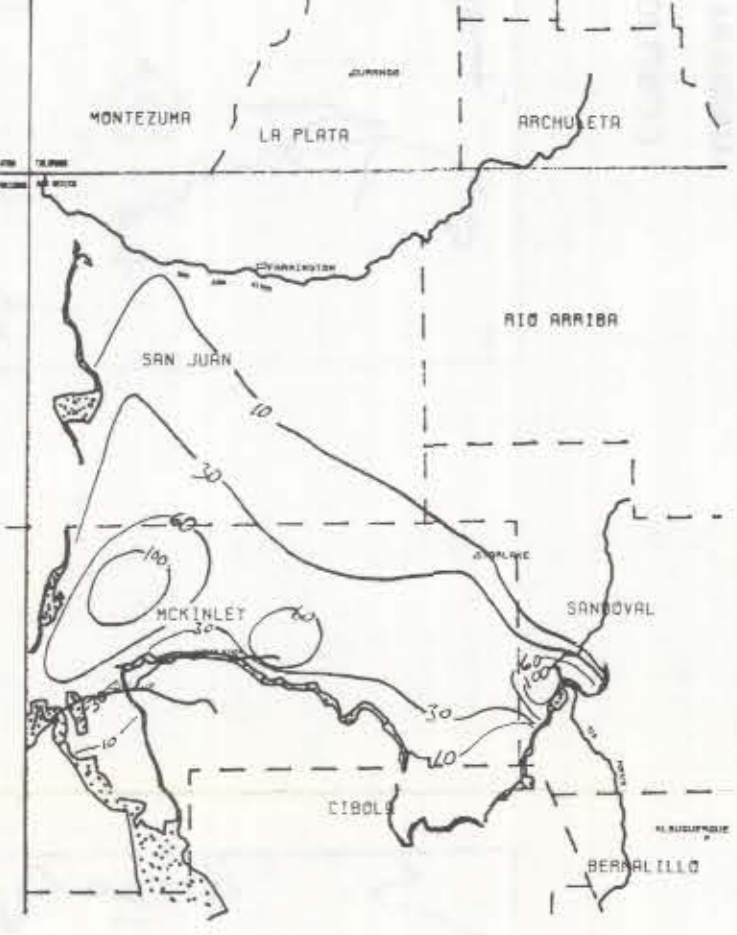
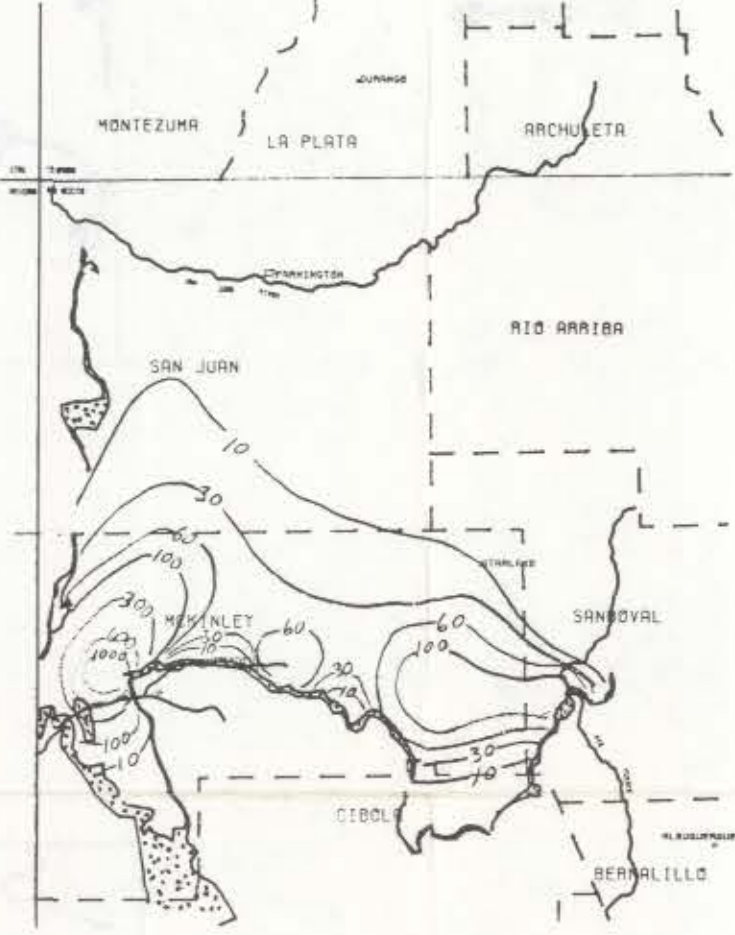
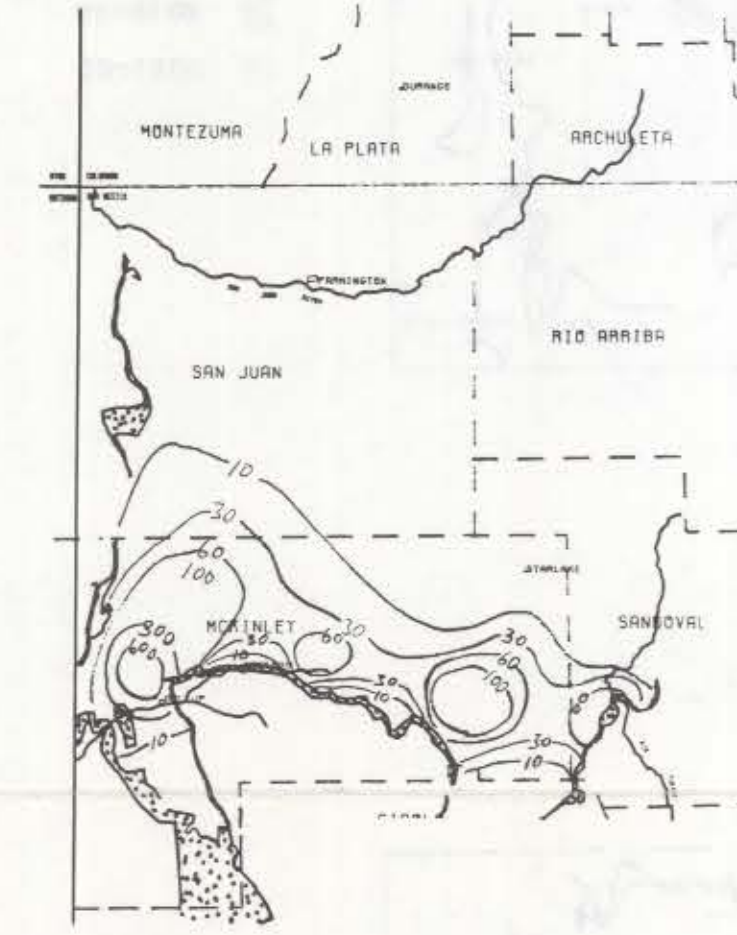
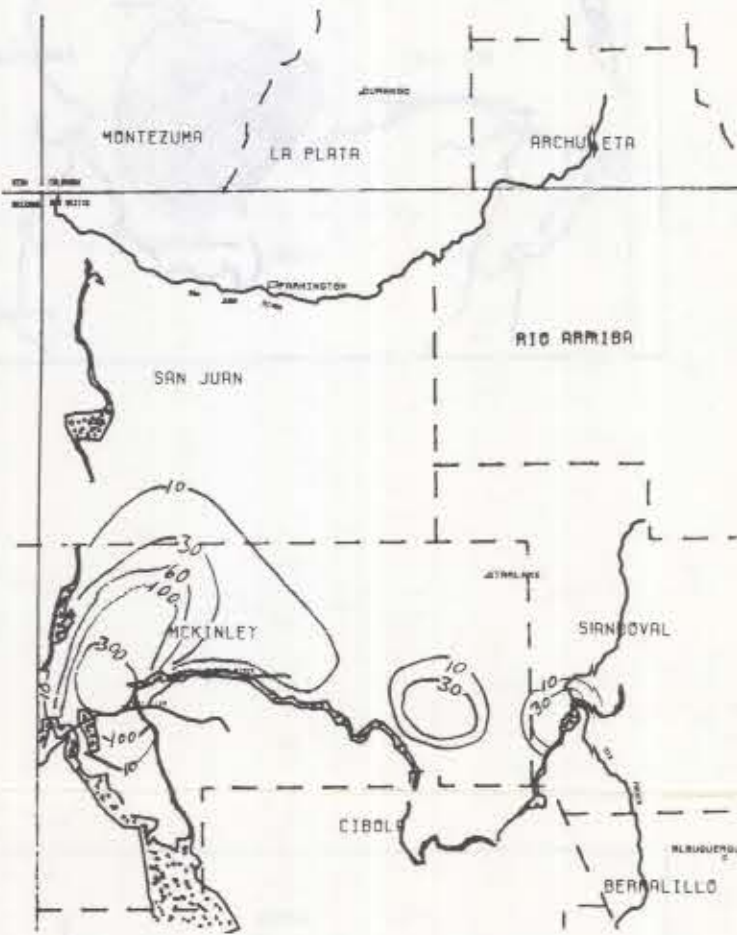
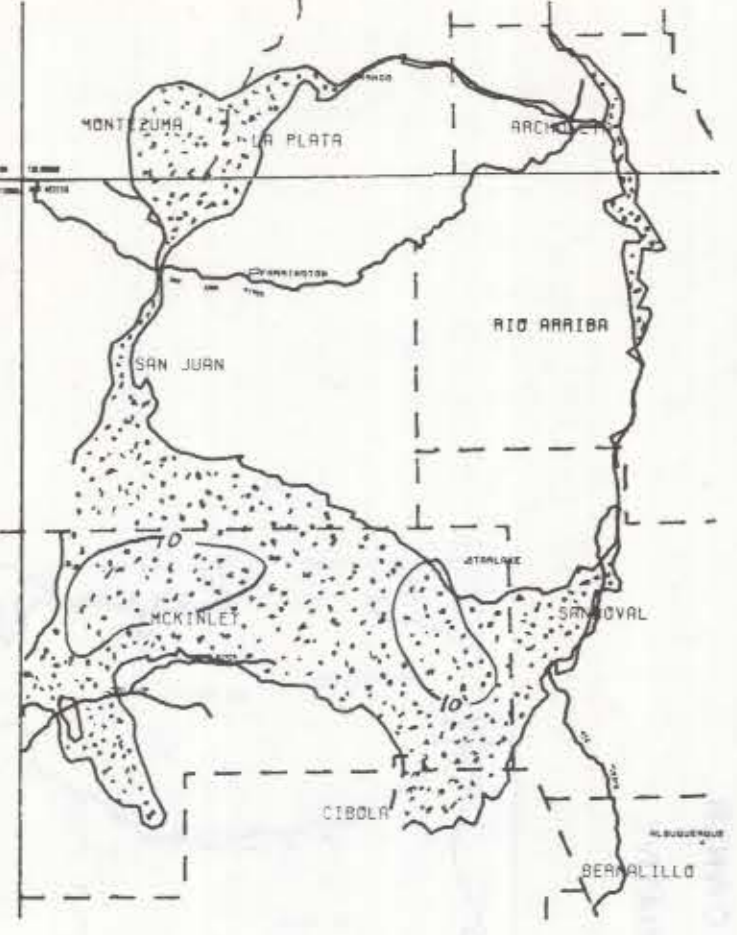
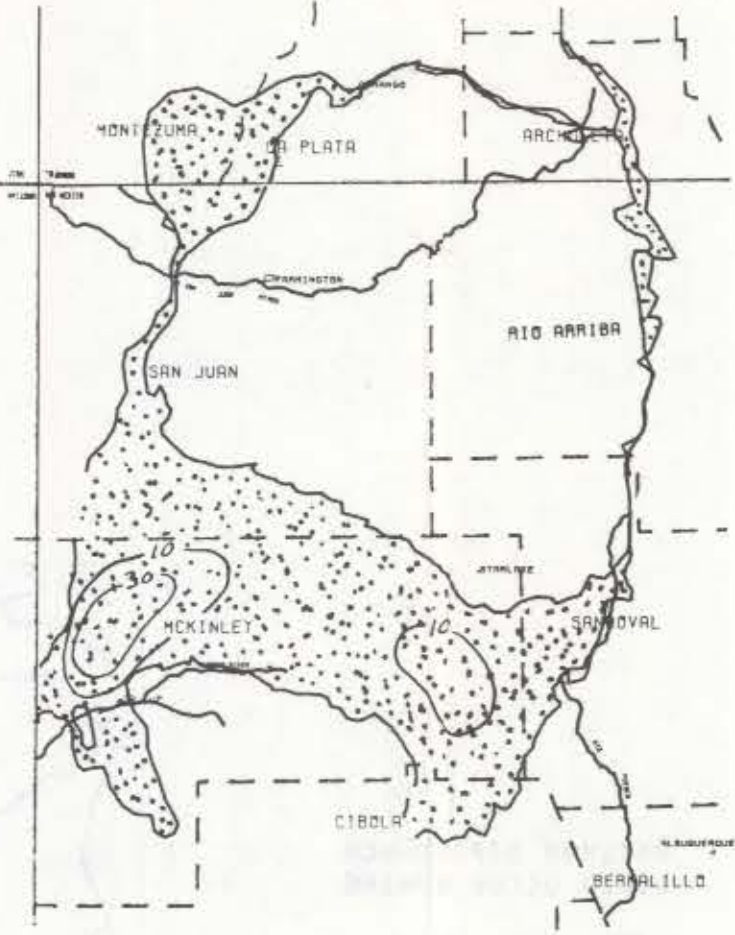
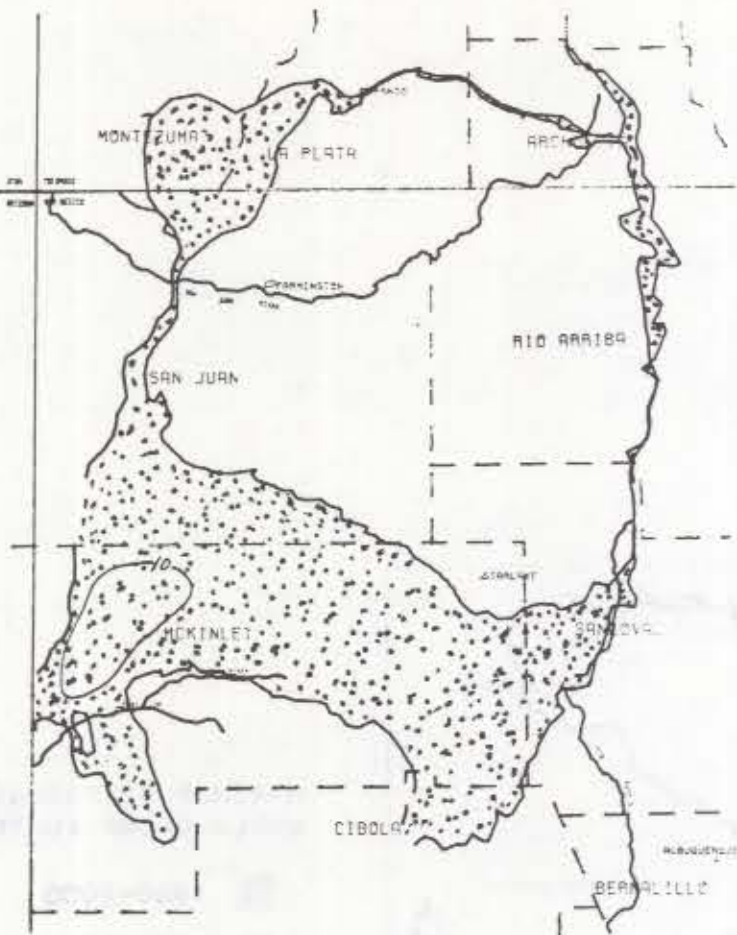
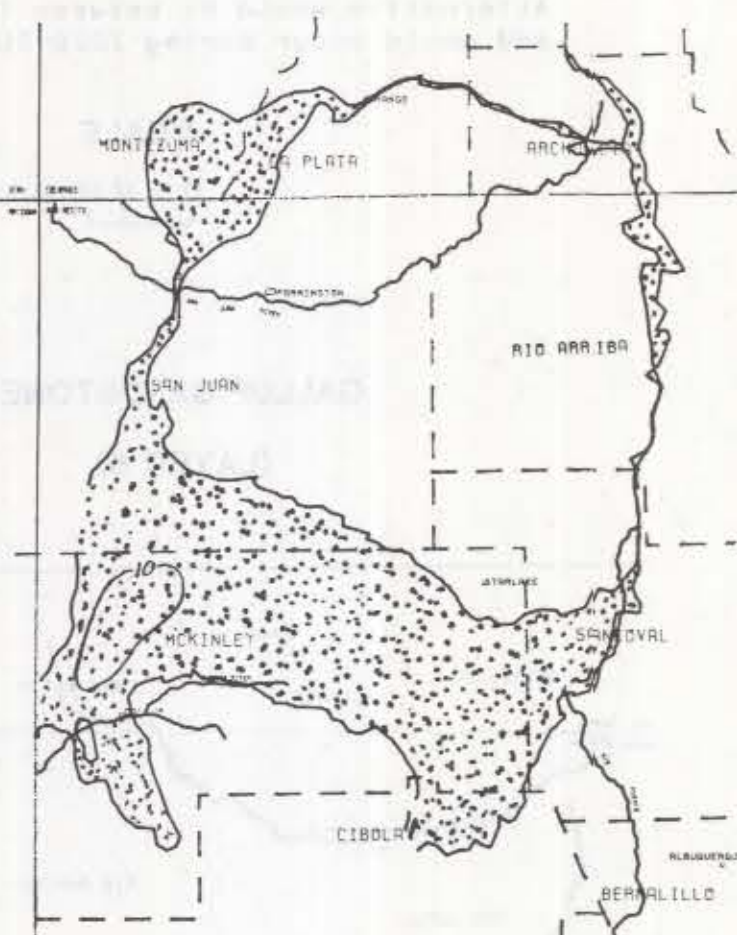
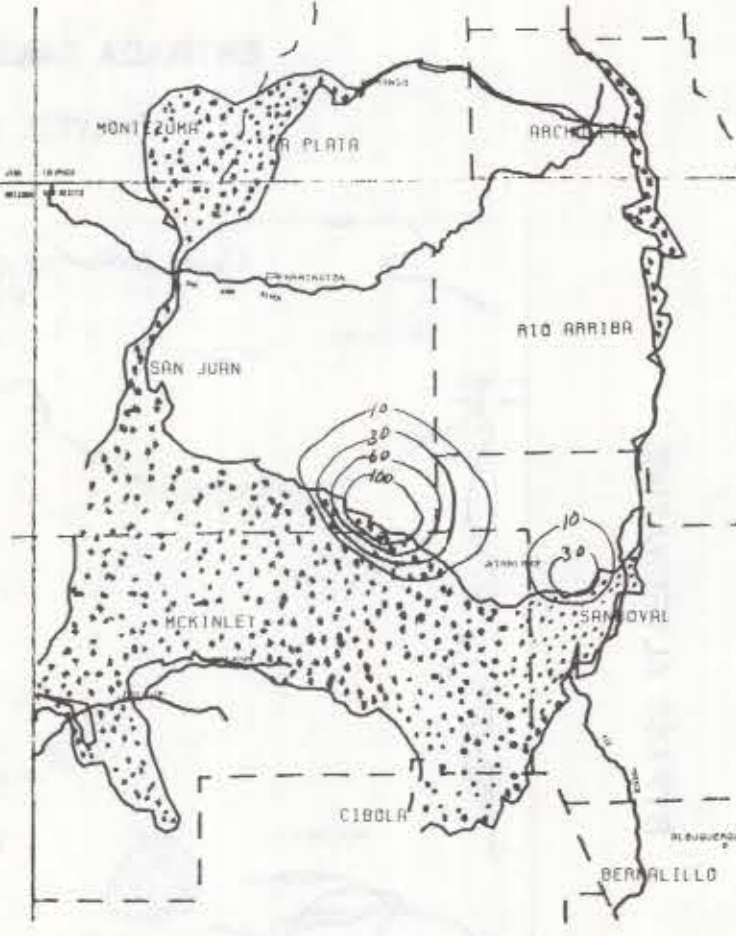
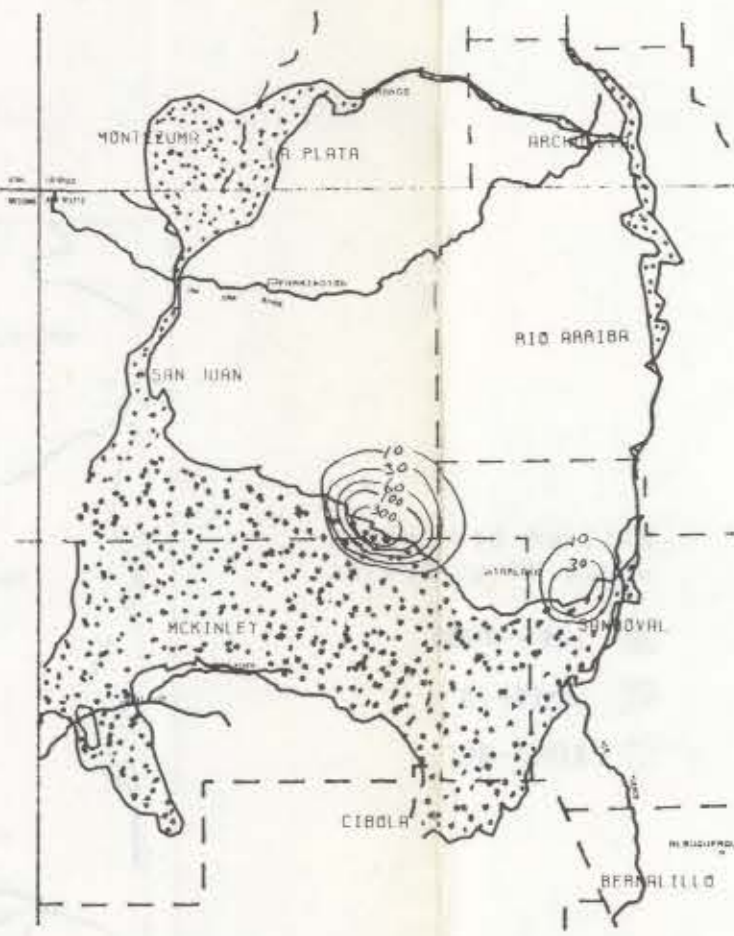
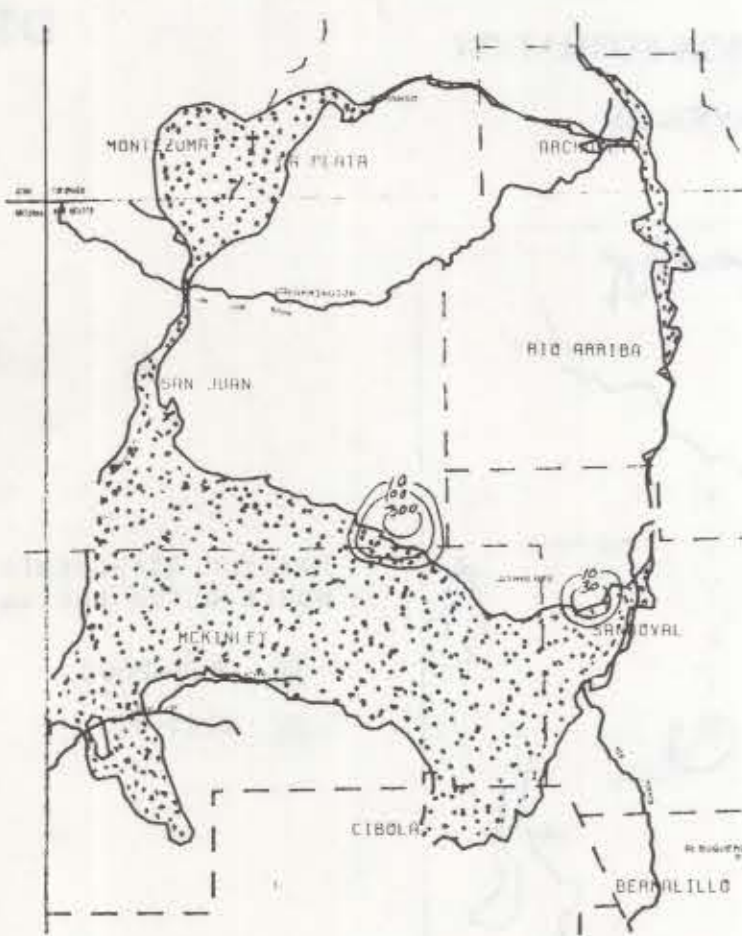
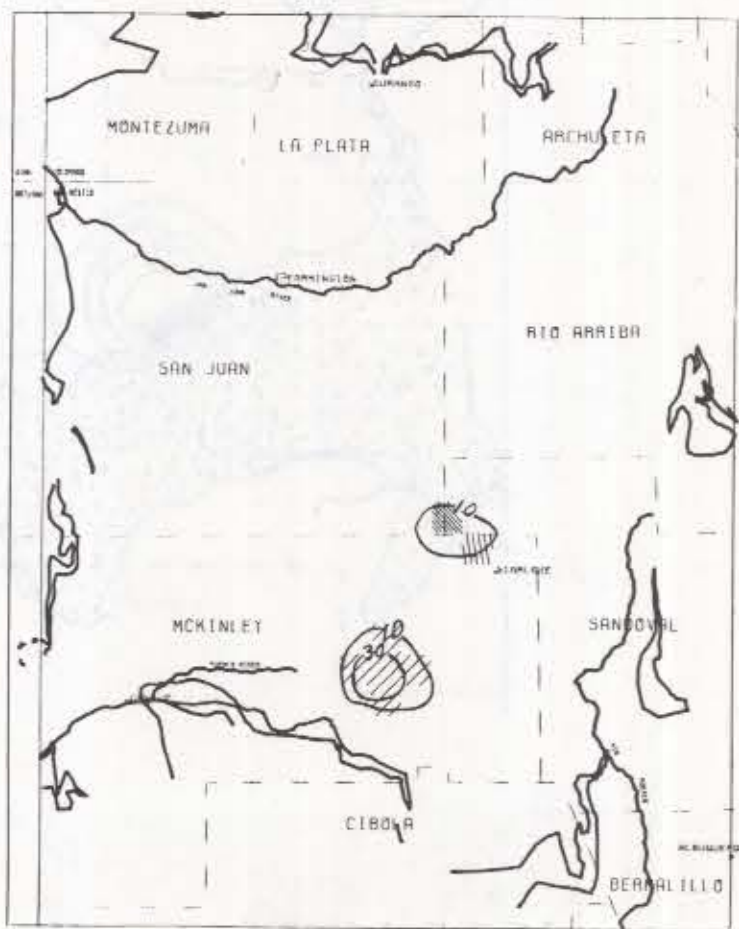


PLATE 2. Maximum differences between projected draw-downs (in feet) of the No Action Alternative and each of the other Alternatives, and the Time Periods during which the maximum differences would occur.

DRAFT

BYPASS ALTERNATIVE

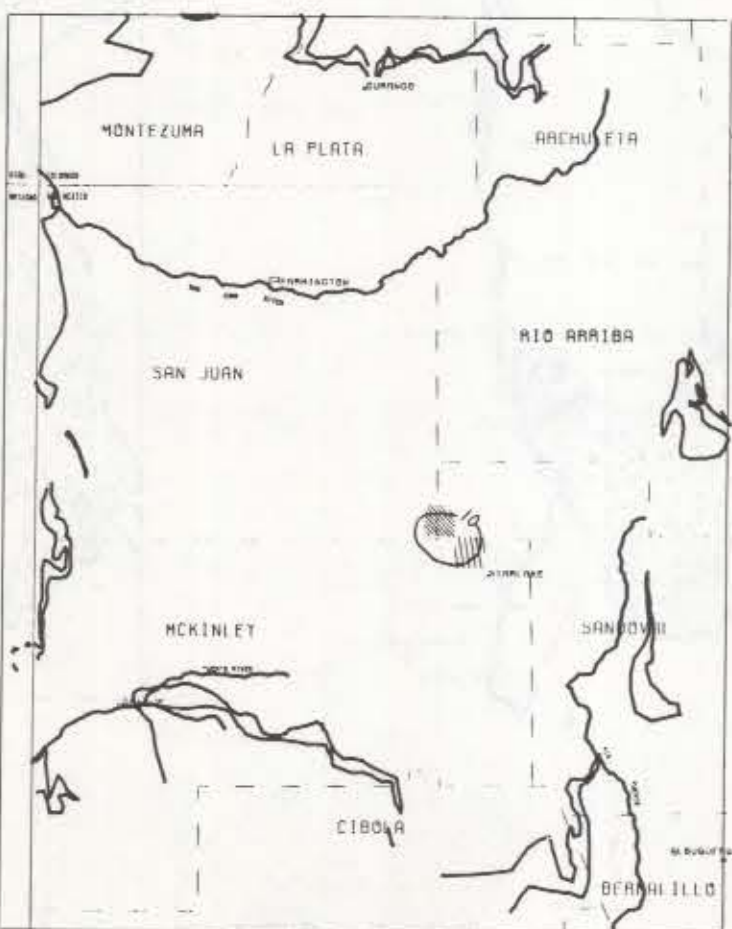
ENTRADA SANDSTONE
(LAYER 1)



MAXIMUM DIFFERENCE
WOULD OCCUR DURING

- 1996-2000
- 2011-15
- 2026-30

WESTWATER CANYON MEMBER
OF MORRISON FORMATION
(LAYER 3)



MAXIMUM DIFFERENCE
WOULD OCCUR DURING

- 1996-2000
- 2011-15

EXPLANATION

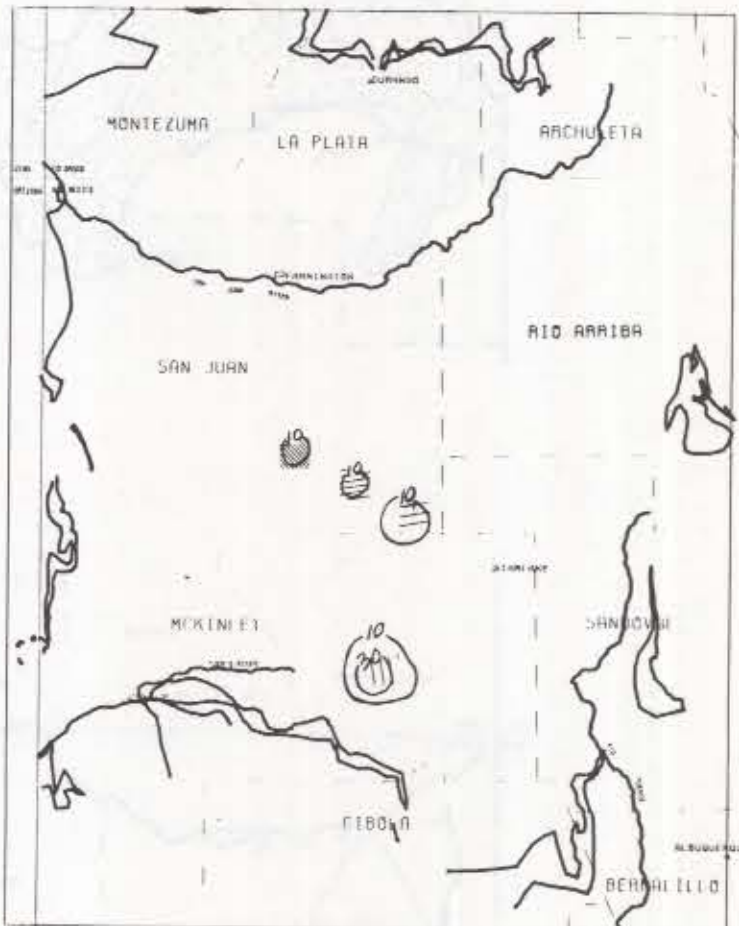
Line of equal maximum difference in water-level decline, in feet, between No Action Alternative and other Alternative. Contour interval is variable.

Example:

At Point A on the map for the Gallup Sandstone (Layer 5)-Target Alternative, the maximum difference in drawdown between the No Action Alternative and the Target Alternative would be between 10 and 30 feet and would occur during 2026-30.

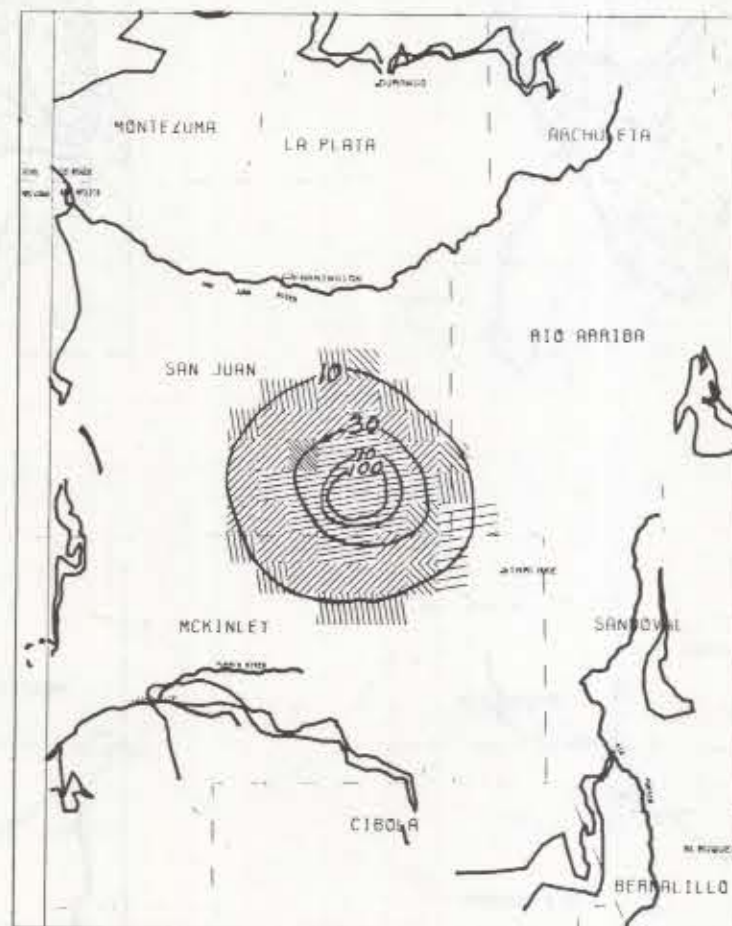
SCALE
0 6 12 18 MILES

MINIMUM SURFACE OWNER
CONFLICTS ALTERNATIVE



MAXIMUM DIFFERENCE
WOULD OCCUR DURING

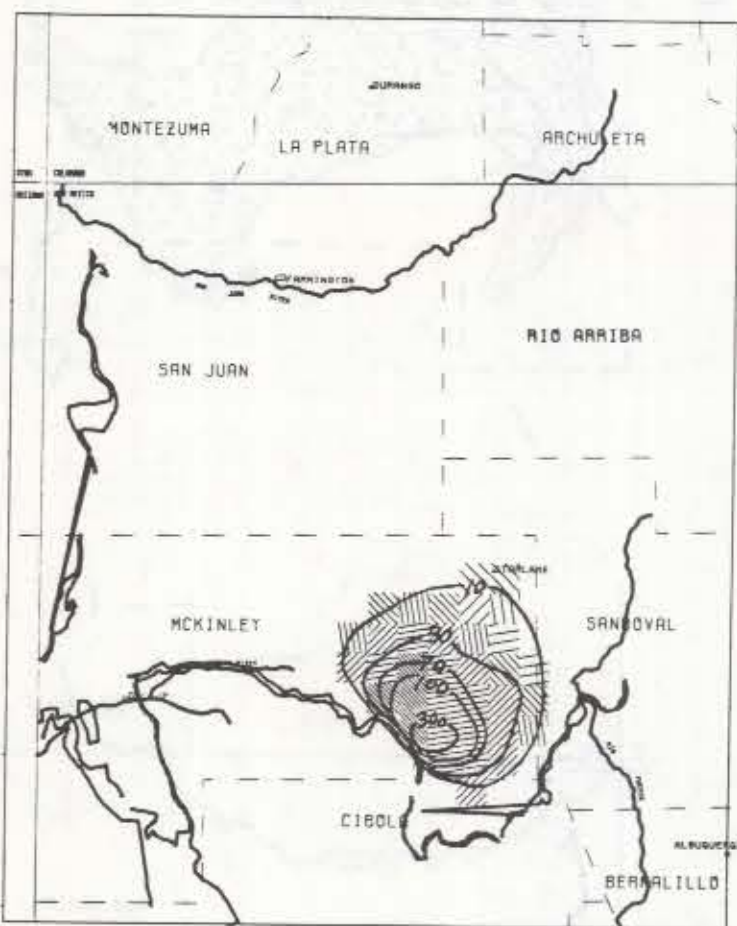
- 1996-2000
- 2001-05
- 2021-25
- 2031-35



MAXIMUM DIFFERENCE
WOULD OCCUR DURING

- 1996-2000
- 2001-05
- 2006-10
- 2011-15
- 2016-20
- 2021-25

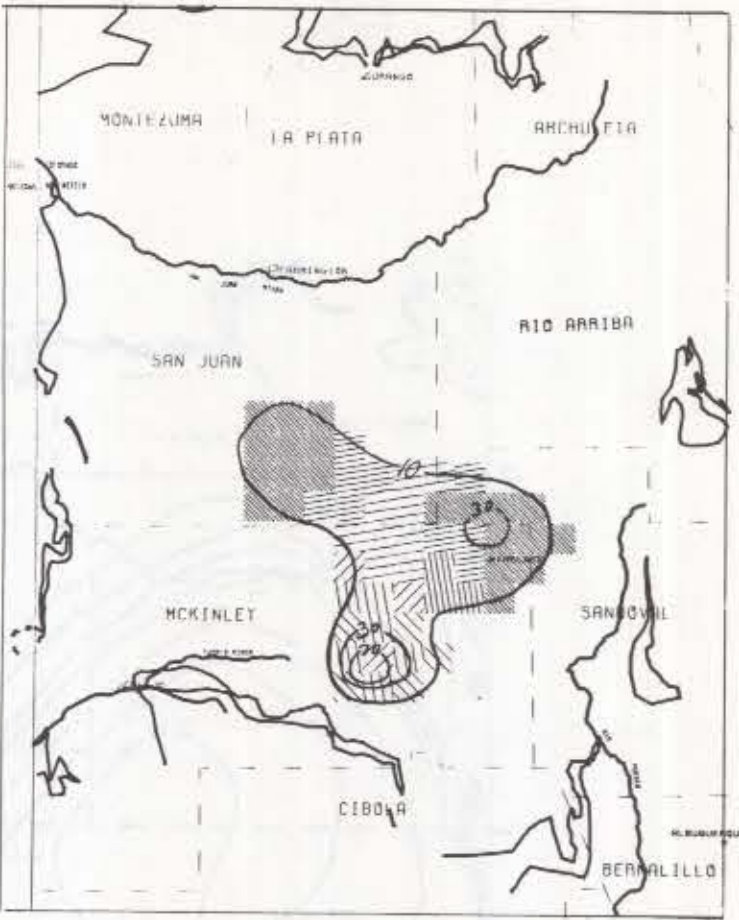
GALLUP SANDSTONE
(LAYER 5)



MAXIMUM DIFFERENCE
WOULD OCCUR DURING

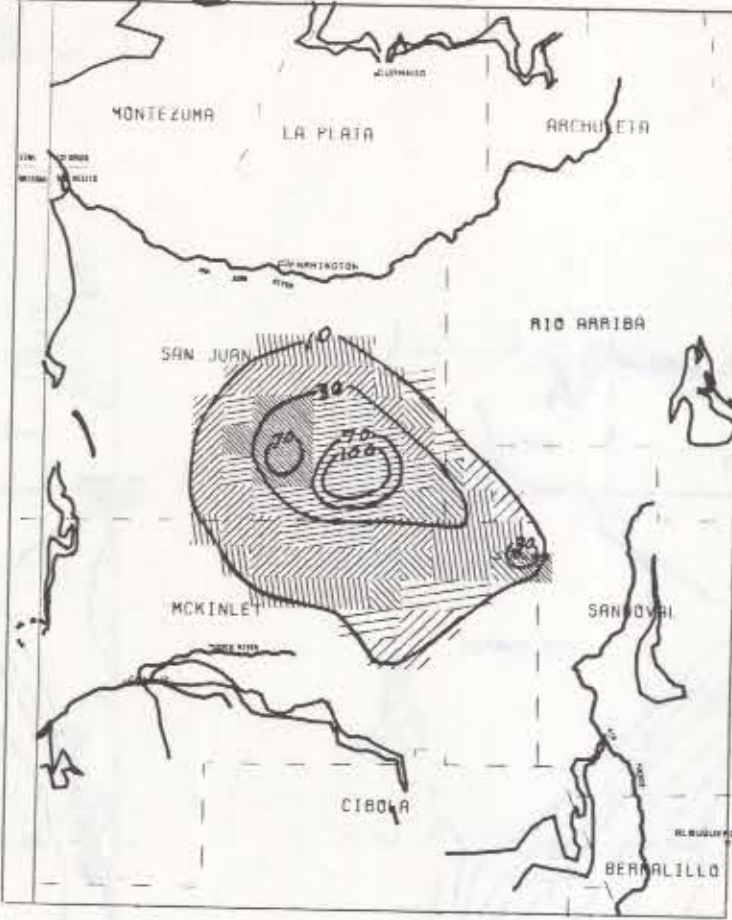
- 1996-2000
- 2001-05
- 2006-10
- 2011-15
- 2016-20
- 2021-25
- 2026-30
- 2031-35
- 2036-40

TARGET ALTERNATIVE



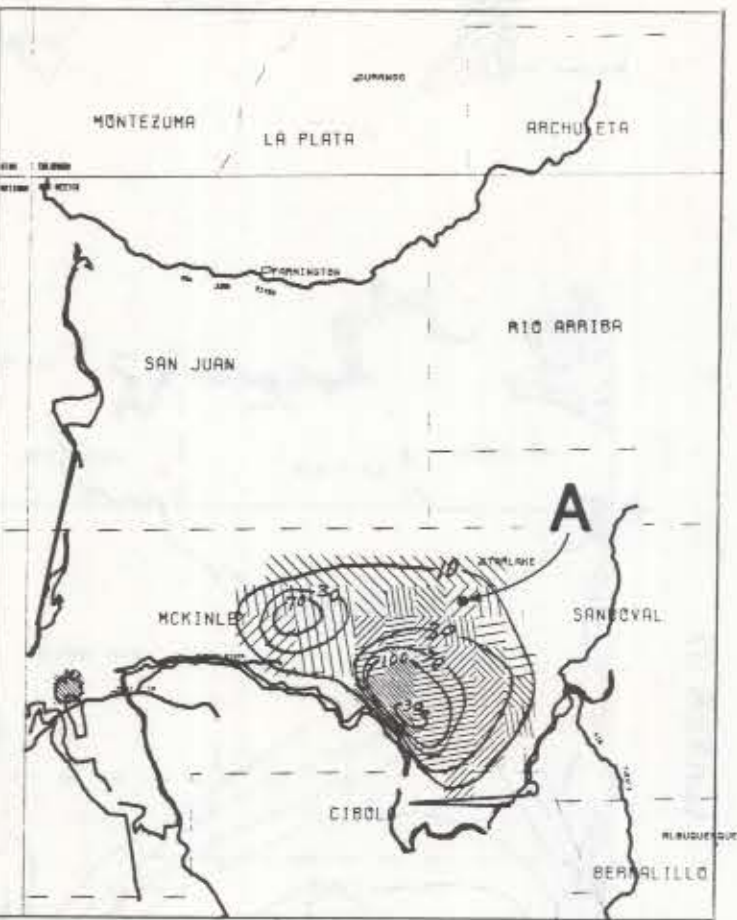
MAXIMUM DIFFERENCE
WOULD OCCUR DURING

- 1996-2000
- 2001-05
- 2011-15
- 2021-25
- 2026-30
- 2031-35
- 2036-40



MAXIMUM DIFFERENCE
WOULD OCCUR DURING

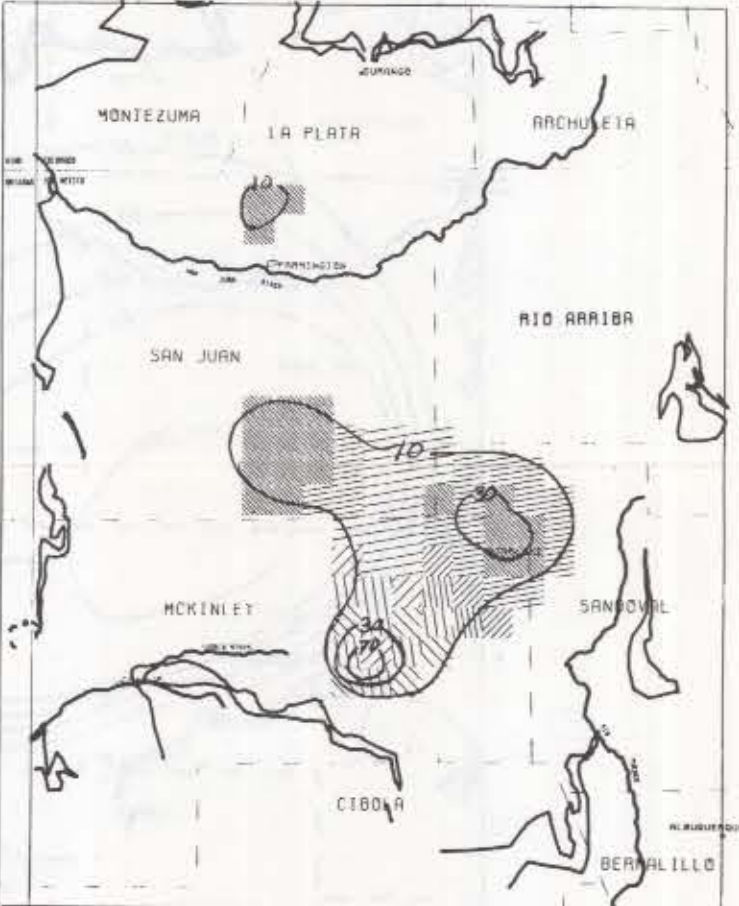
- 1996-2000
- 2001-05
- 2006-10
- 2011-15
- 2016-20
- 2021-25
- 2026-30



MAXIMUM DIFFERENCE
WOULD OCCUR DURING

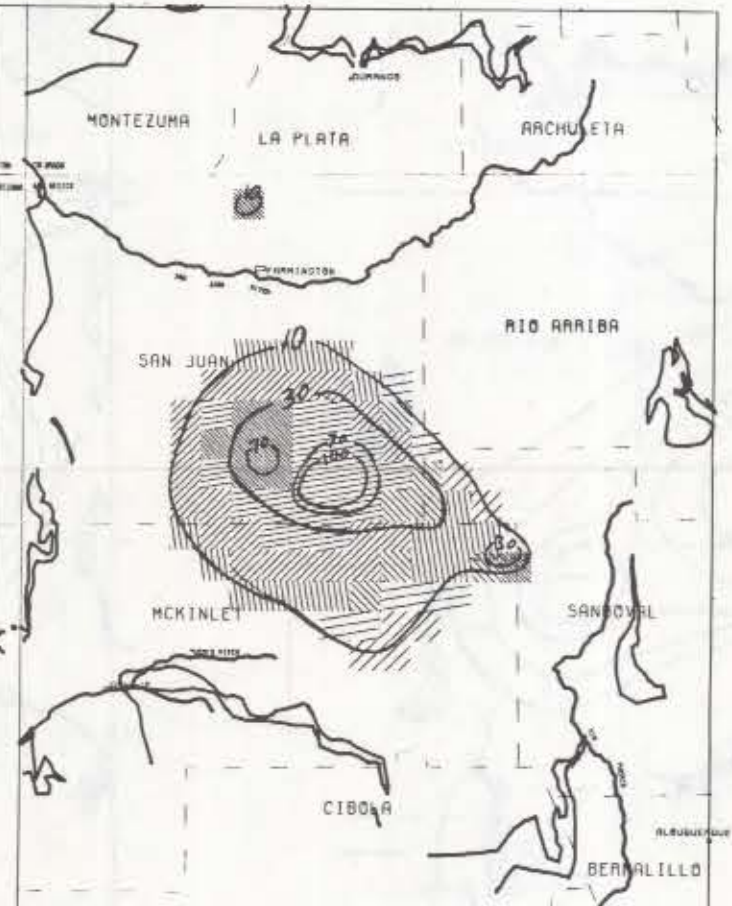
- 1996-2000
- 2001-05
- 2006-10
- 2011-15
- 2016-20
- 2021-25
- 2026-30
- 2031-35
- 2036-40

HIGH-LEVEL ALTERNATIVE



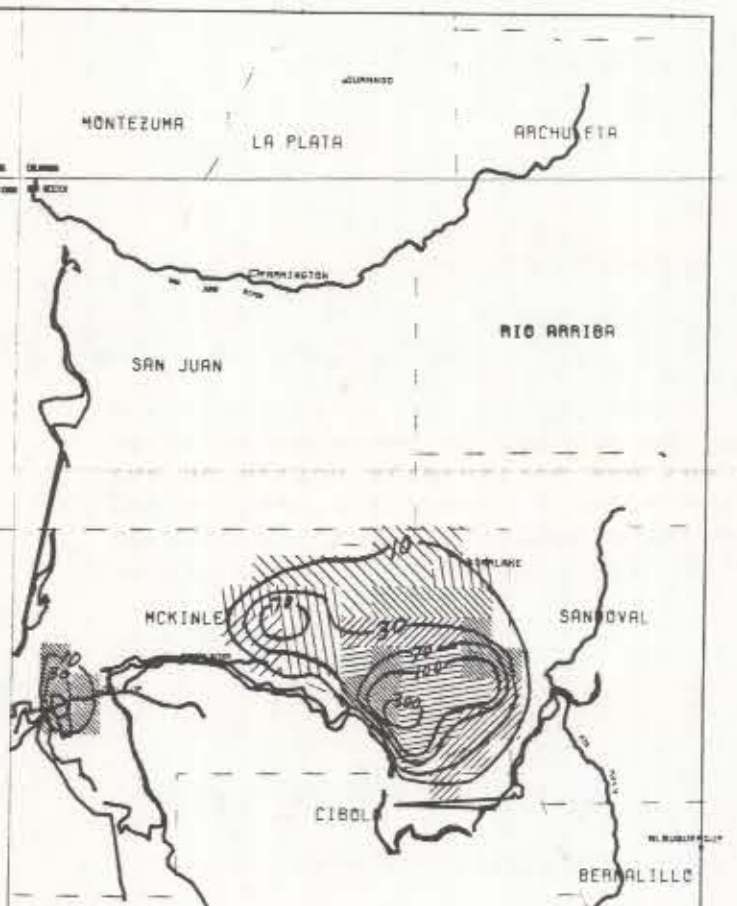
MAXIMUM DIFFERENCE
WOULD OCCUR DURING

- 1996-2000
- 2001-05
- 2006-10
- 2011-15
- 2021-25
- 2026-30
- 2031-35
- 2036-40



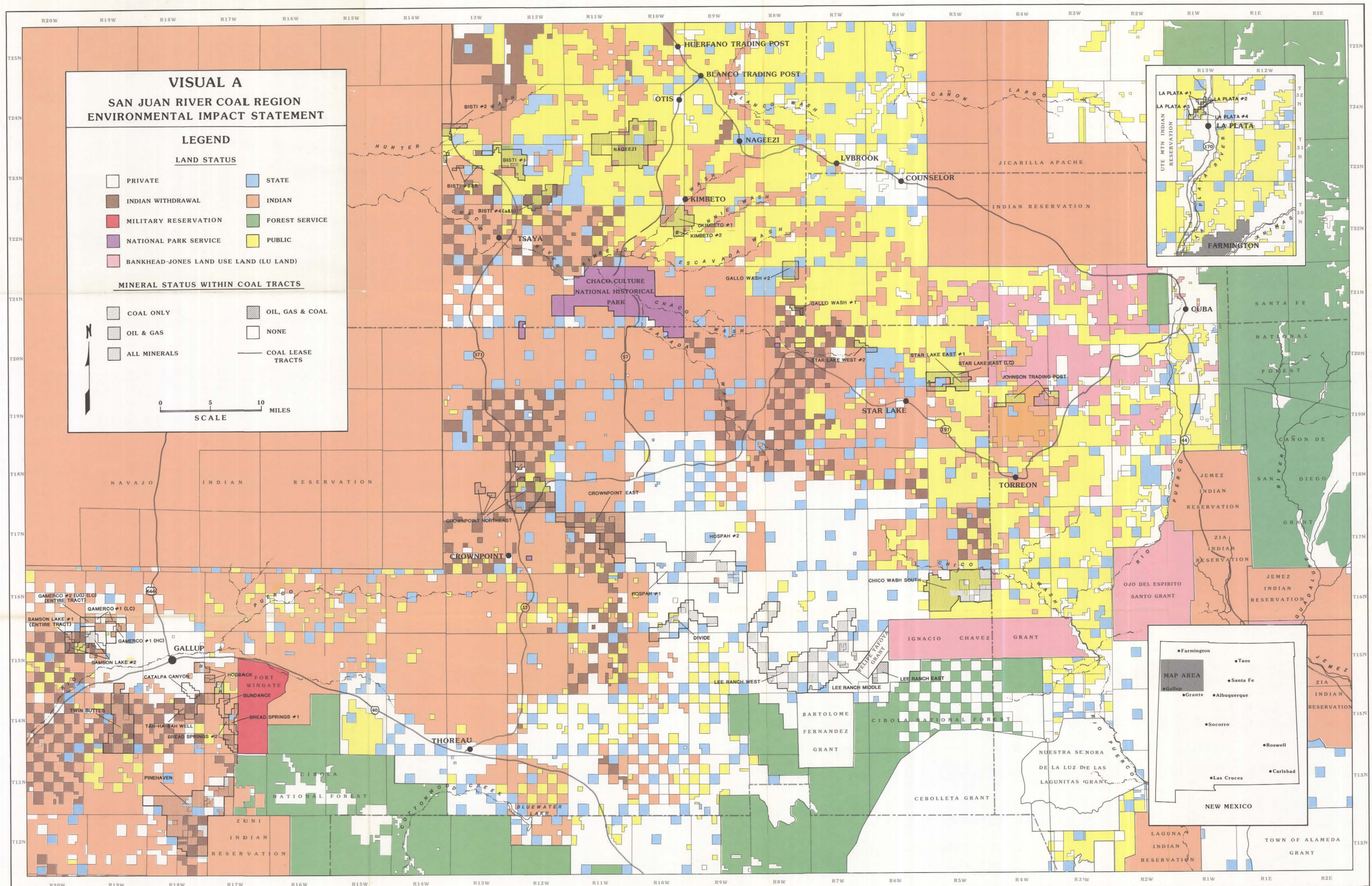
MAXIMUM DIFFERENCE
WOULD OCCUR DURING

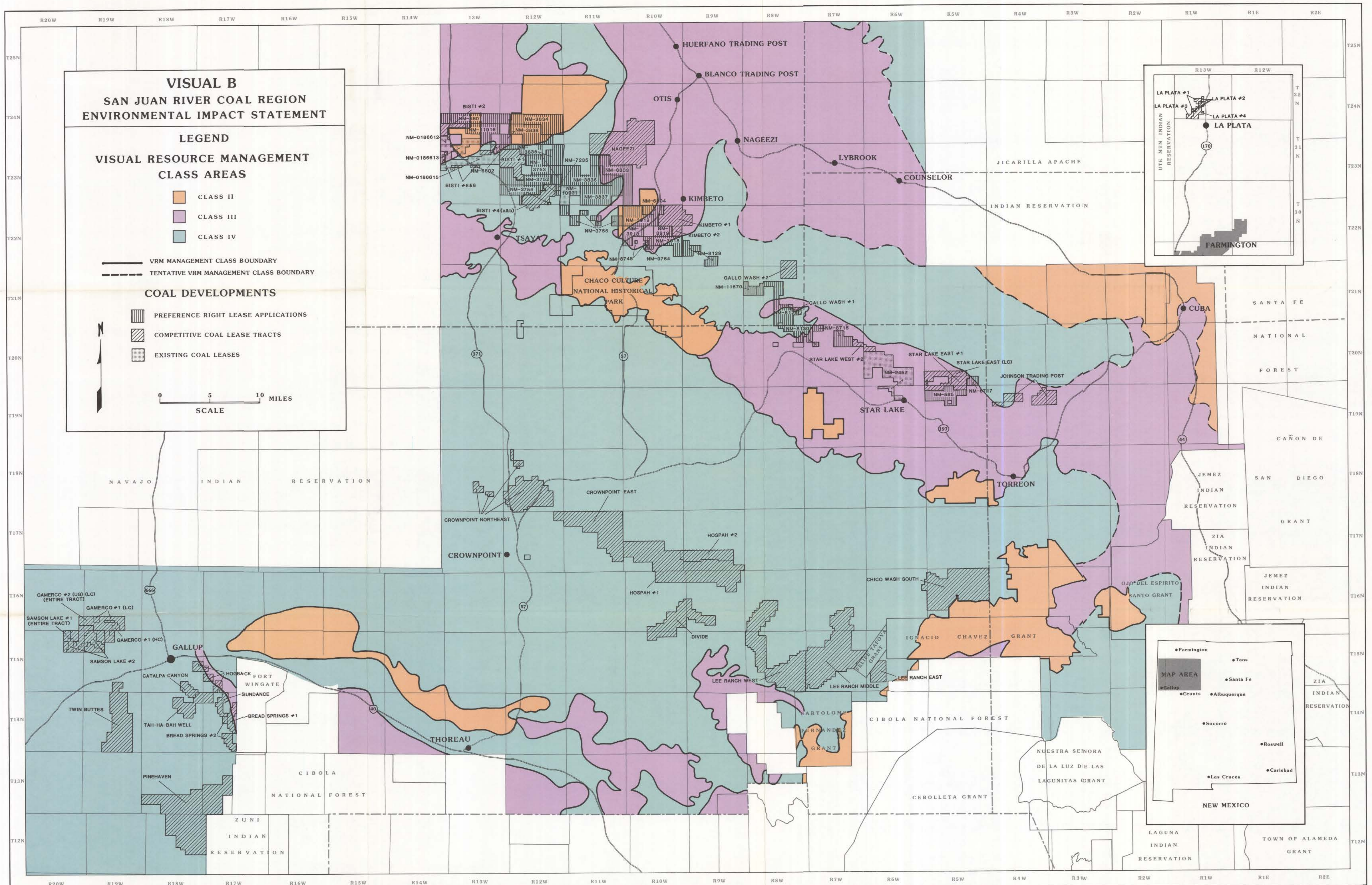
- 1996-2000
- 2001-05
- 2006-10
- 2011-15
- 2016-20
- 2021-25
- 2026-30

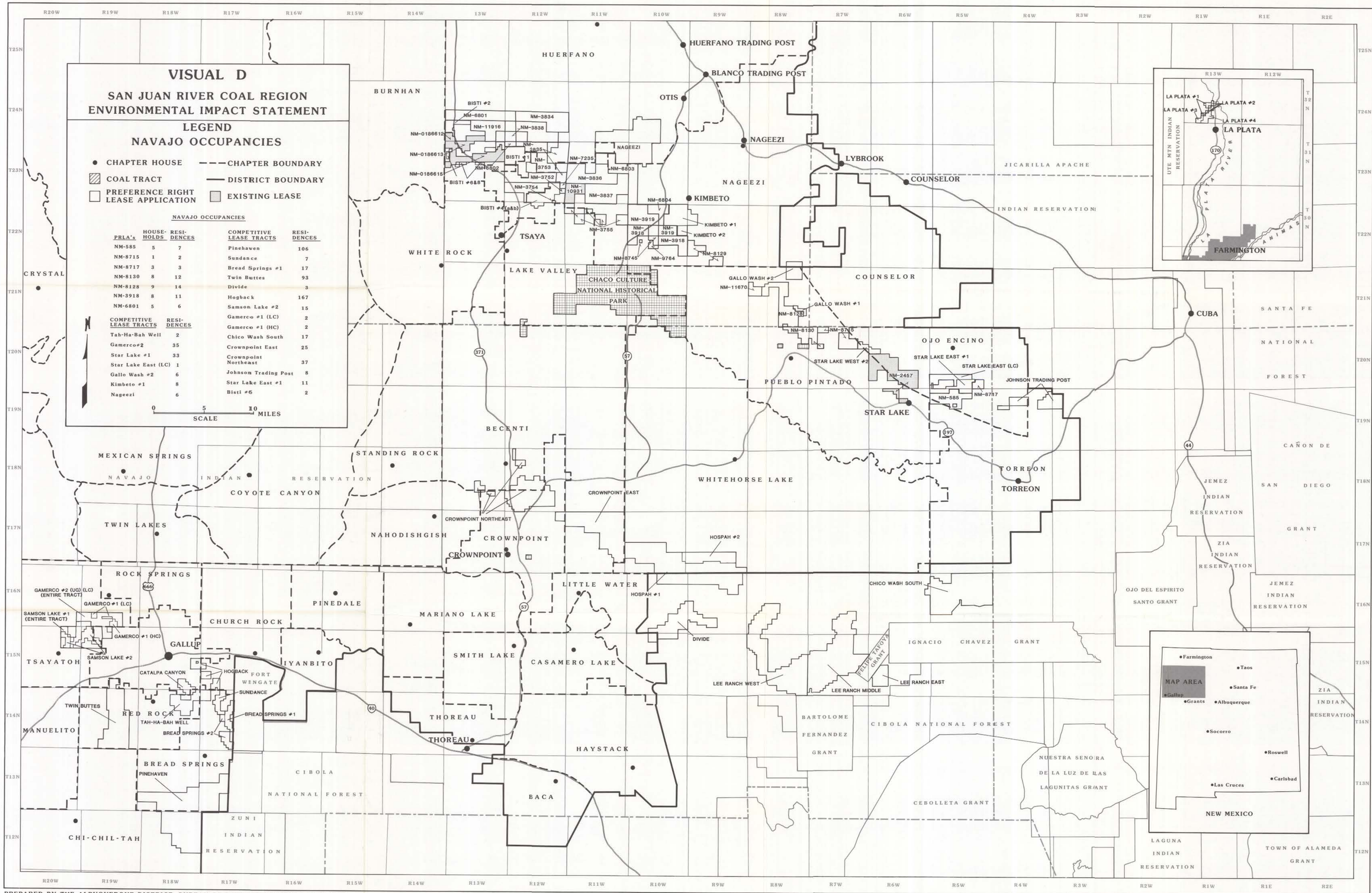


MAXIMUM DIFFERENCE
WOULD OCCUR DURING

- 1996-2000
- 2001-05
- 2006-10
- 2016-20
- 2026-30
- 2031-35
- 2036-40







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